ENGINEERING NEWS

A JOURNAL OF

CIVIL ENGINEERING AND CONSTRUCTION

VOLUME LXX

JULY—DECEMBER, 1913

HILL PUBLISHING COMPANY

505 PEARL STREET

NEW YORK

INDEX

TO VOLUME LXX, JULY—DECEMBER, 1913

Subdivided into GENERAL (including *Technical Articles, Editorials, Letters to the Editor, Current News*); AUTHORS; ENGINEERING LITERATURE, and CONTRACT PRICES

GENERAL INDEX

PAGE

A

ABUTMENTS:
Bridge abutment with cantilever wings *817
Design of concrete abutments without wing walls, for deck girders. By C. M. Luther *816
Excavating a bridge abutment through quicksand. By Frank I. Barrett *608
Formulas for finding the intersections of wing walls with the main abutments of bridges. By S. Reswick, *366, (erratum) 626
Formulas for length and height of abutment wing-walls, for skew crossings (n) *1309

ACCIDENTS:
Balloon explosion, German dirigible "Zeppelin L-2," Oct. 17 (n) 842
Baseball stand collapsed, Tulsa, Okal., Oct. 28 (n) 946
Blasting accidents:
Catskill Aqueduct tunnel, Shaft 20, New York, Aug. 6 (n) 323
Parham, Ont., June 25 (n) 47
Prevention, Rules for misfires in blasting 1227, (ed) 1245
Boiler explosions:
Ohio River towboat "Alice," Coraopolis, Penn., Aug. 30 (n) 528
Staten Island, Vertical water-tube boiler exploded at Livingston, S. I., Oct. 21 (ns) 842, 892
U. S. Destroyer "Craven," Sept. 10 (n) 635
Brick chimney collapsed; International Harvester Co., Chicago, Sept. 29 (n) 683
Bridge accidents:
Centerville, Ark., Wooden trestle collapsed, Nov. 17; Dardanelle & Ola R. R. (n) 1107
Collapse of small bridges at Chester, Penn., Boonville, N. Y., Brookhaven, Miss., Port Dover, Ont., and Youngstown, Ohio (n) 435
Fort Worth, Tex., Structural steel reinforcement of a 125-ft. concrete arch fell, July 11 (n) 234
Green Bay, Wis., Oct. 14 (n) 779
Harrisburg, Penn., Failure of a small highway bridge by breaking of a timber tension chord *1044
Lafayette, Ind., Pier collapsed, June 26 (n) 132
Lawrence, Mass., Wooden footbridge leading to bath house collapsed, June 30 (n) 90
Ohio River, West Jefferson, Ohio, Nov. 14 (n) 1107
Partial failure of a light highway bridge. By F. Tissington *904
Portland, Ore., Wooden floor of Oregon-Washington Ry. & Navigation Co. bridge, damaged by fire July 30. By John W. Cunningham, (n) 323, *376, (erratum) 525
Richmond, Va., Sixty-foot bridge span collapsed, Nov. 3 (n) 1055
Toledo, Ohio, Electric car suspended by rear trucks from bridge pier, Oct. 31 (n) 989
Building accidents:
Baltimore, Md., Scaffold gave way on building, July 7 (n) 132
Brooklyn, N. Y., Sheet-iron cornice loosened from frame building at South Second St. & Marcy Ave. (n) 234
Camden, N. J., Sept. 5 (n) 574
Farmville, N. C., Sept. 5 (n) 574
Green Castle, Ind., Grandstand collapsed at De Pauw University, Nov. 1 (n) 1055
Guadeloupe, French West Indies, Sept. 7 (n) 754
Hartford, Conn., Collapse of warehouse walls, Nov. 3 (n) 989
Marietta, Ohio, Theater floor collapsed, July 26 (n) 276
New York City:
Loading platform collapsed in Lexington Ave. subway excavation, Nov. 10 (n) 989
Wooden derrick boom broke, Broadway and 37th St., Nov. 29 (n) 1208
Peterboro, Ont., Department store collapsed, Aug. 28 (n) 528
Vancouver, B. C., Collapse of a reinforced-concrete frame in a building. By A. P. Hueckel *290

PAGE

ACCIDENTS: (Continued)
Cave-ins:
Chicago, Ill., Street collapse, Randolph St., opposite a new 12-story extension of the Marshall Field dry-goods store *1206
New York City, Two street cave-ins: East New York, Brooklyn, and Lexington Ave. & 26th St. (n) 683
Paterson, N. J., Oct. 7 (n) 779
St. Louis, Mo., Collapse of an old 5-ft. brick sewer *776
Susanville, Ore., Railway tunnel cave-in, Sept. 10 (n) 635
Collapse of a thin partition wall in water-works settling basin; Fort Smith, Ark. By Walter R. Mason *1049, *1179, (let) 1321
Collapse of piers, etc., guarded against in Germany by government inspection (n) 205
Crane causes fall of casting; Peterboro, Ont., Sept. 20 (n) 683
Earthquakes:
Central American earthquakes cause depression in bed of ocean off coast of Panama (n) 929
Shocks in Canal Zone, Oct. 1-2 (n) 733
Electric railway accidents:
Aurora, Elgin & Chicago Ry., Between Wheaton and Aurora, Oct. 22 (n) 989
East Cambridge, Ohio, July 13 (n) 185
Toledo, Ohio, Electric car suspended by rear trucks from bridge pier, Oct. 31 (n) 989
Villeneueve-Loubet, France, Sept. 17 (n) 733
Scranton Ry. Co., Scranton, Penn., Oct. 3 (n) 730
Ellis Island ferryboat, New York Harbor, Sept. 9 (n) 574
Explosions:
Buffalo, N. Y.:
Dust explosions, Sept. 13 574
Grain elevator (ns) 47, *88, (ed) 223, 386, 1331
Fire causes explosion in oil tank, Brooklyn, N. Y., Nov. 12 (n) 1055
Fuel-oil tank, steamship "Mohawk," Tompkinsville, S. I., June 27 (n) 47
Pittsburgh, Penn., Sewer explosion, Nov. 25 *1157
Prevention of, Storing and handling inflammable liquids; Martini & Huneke safety system for *1011
Tank car, Sharon, Penn., Nov. 24, (n) 1159
Union Pacific R. R. locomotive, Evanston Wyo., Aug. 19 (n) 484
Fires:
Bayonne, N. J., Standard Oil Co. property destroyed July 2 (n) 132
Binghamton, N. Y., Special report on Clothing Co. fire (n) 435
Brooklyn, N. Y., Fire causes explosion in oil tank, Nov. 12 (n) 1055
"Burgomeister Hackman," Bush Terminal, Brooklyn, N. Y., Aug. 28, (n) 484
Coal bunker of "Jan van Nassau" on fire four days (n) 989
Coasting steamer "Bangor" destroyed, July 23 (n) 234
Domestic and foreign records of fire loss for 1912 405
Flue gas for fire fighting on shipboard 1235, (ed) 1247
German ship "Kalymos" destroyed, Oct. 31 (n) 946
Hot Springs, Ark., Sept. 5 (n) 528
Huron, Mich., Grand Trunk Ry. System shops, Nov. 26 (n) 1159
"Imperator," Hoboken, N. J., Aug. 28 (n) 484
Inert gases for fighting fire at sea, 1235, (ed) 1246
Ivorydale, Ohio, Benzine fumes ignited in tank car, Oct. 23 (n) 946
Jackson, Miss., Wooden prison "cage" Oakley state convict farm, (n) 234
Jersey City, N. J., Aug. 20 (n) 434
New York City, Factory fire in two adjacent buildings, Oct. 24 (n) 892
North Weymouth, Mass., American Agricultural Chemical Co., July 22 (n) 234

PAGE

ACCIDENTS: Fires: (Continued)
Portland, Ore.: Wooden floor of Oregon-Washington Ry. & Navigation Co. bridge, July 30. By John W. Cunningham (n) 323, *376, (erratum) 525
Railway trestle set on fire by short-circuit on car of Brooklyn Rapid Transit Co., June 29 (n) 90
Safeguarding life in factory fires; Life hazard in crowded buildings due to inadequate exits (ed) 224, *228 (let) 383
St. Paul, Minn., Temporary railway station destroyed by fire, Oct. 4 733, (ns) 779
Savannah, Ga., Underground fire, in old garbage dump, Nov. 27 (n) 1159
Santa Margarita tunnel of the Southern Pacific Co.; Obstinate railway tunnel fire in California. *1234
"Scotsdyke," of Glasgow, English Channel, Nov. 19 (n) 1159
Floods:
Albany, N. Y., Maximum flood of Hudson River, March, 1913 (n) 947
Austin, Penn., End of criminal prosecutions which followed dam failure (n) 1260
Black River Falls, Wis., Settlement of flood loss between city and La Crosse Water Power Co. (n) 1304
Cairo, Ill., Floods and levees at one of the most vulnerable points from a flood standpoint in the Mississippi Valley *104
China, Chinese famine and proposed flood prevention. By Charles Davis Jameson *588
Columbus, Ohio, Recommendations of the consulting hydraulic engineers *631
Dayton, Ohio, Preliminary report on flood protection 775, (lets) 880, (n) 989
Illinois, Phenomenally heavy rain in 1912 245
Lima, Ohio, Flood protection; report on protective work against inundation by the Ottawa River, made by the W. J. Sherman Co., Consulting Engineers, of Toledo, Ohio 828
Mississippi River, Flood control problem summarized 1121
Nevada, Flood destruction on the San Pedro, Los Angeles & Salt Lake Ry. By H. G. Tyrrell *16
New York City, Heavy rainfall of Sept. 5 (n) 528
Ohio:
Board of health bulletin on (n) 132
How far must an engineer be guided by his client's resources, (lets) 1095, 1318
Pennsylvania R. R., Hoisting locomotive out of the Mad River after 1½ months' submergence (n) *613
Preliminary report of Army Engineers on the Central States floods; Central control recommended; Reservoirs of no use, 725, (ed) 771
San Salvador, Ten-inch rainfall in Oct. 27-28 (n) 946
Source of heavy rainfalls 8
Texas, Heavy floods at Houston and San Antonio in September (n) 779
Forest fires:
California, Forest fires cause damage in northern California (n) 677
Coöperation for protection from forest fires (n) 518
Effect of forest fires on standing hardwood timber (n) 191
Prevented in western Montana by surveyors (n) 574
Railroad speeder for fire protection used by the United States Fire Service (n) 634
Tool used to fight fires in California forests (n) 465
Gas and gasoline explosions:
Cincinnati, Ohio, Plant of C. Streit Mfg. Co., Sept. 22 (n) 683
Malden, Mass., New England Dyeing & Cleaning Co., July 26 (n) 276
Sharon, Penn., Tank car, Nov. 24, (n) 1159
Guadeloupe, French West Indies; stand collapsed, Sept. 7 (n) 754

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

265731

PAGE

ACCIDENTS: (Continued)
Gun explosions:
Fort Moultrie, near Charleston, S. C., May 22 ..... (n) 47
Naval Proving Ground, Indian Head, Md., July 30 ..... (n) 323
Pola, Austria, Aug. 21 ..... (n) 434
Landslides:
British Columbia Division of Canadian Pacific Ry., Sept. 4 ..... (n) 733
Canadian Pacific Ry., Ruby Creek, Man., Nov. 17 ..... (n) 1107
Catskill Aqueduct tunnel near Shaft 2, Mosholu Parkway and Jerome Ave., New York, Aug. 1 ..... (n) 323
New York City, Lexington Ave. subway, Sept. 29 ..... (n) 733
Panama Canal:
Grouting process for preventing slides on the Panama Canal. By A. S. Zinn *406
Portobello quarry, Panama, Aug. 11 ..... (n) 386
Sliding ground in Culebra cut. By Donald F. MacDonald 408
Sloughing off of the Mississippi levee at Helena, Ark. *1014, (ed) 1037
London England, Motor omnibus accidents. By H. Raynar Wilson 550
Mine accidents:
Bangalore, India ..... (n) 434
Centralia, Penn., Sept. 26 ..... (n) 724
Clifton, Ariz., Coronada Mine, Aug. 14 ..... (n) 386
Motor vehicle for relief work at mines *1079
Mine explosions:
Acton, Ala., Nov. 18 ..... (n) 1107
Dawson, N. M., Oct. 22 ..... (n) 891
Grand Junction, Colo., Coal mine explosion, Dec. 16 ..... (n) 1259
East Brookside mine, Philadelphia & Reading Coal & Iron Co., Tower City, Penn., Aug. 2 ..... (n) 323
Firedamp whistle invented ..... (n) 1166
New York City, Falling steel shaft sank ship in East River, Dec. 8 ..... (n) 1260
Ohio River cofferdam at Dam No. 48. By J. C. Oakes *231
Powder explosion, Beloeil, Canada, July 24 ..... (n) 276
Power plant designed as a house of cards: Pioneer Station of the Utah Light & Railway Co., Ogden, (ed) 985, (ns) 990, 1055
Preventing accidents by recording dangerous conditions 943
Prevention of:
Accidents to railway employees fruits of carelessness ..... (ed) 467
Why "safety first" is sound economy. By Alexander Haring 1295
Raft ferry sank, Leechburg, Kan., June 28 ..... (n) 90
Railway accidents:
Alabama Great Southern R. R., Collinsville, Ala., June 20 ..... (n) 47
Baltimore & Ohio R. R., Cincinnati, Ohio, July 20 234
Canadian Pacific Ry.:
Coldwell, Ont., Nov. 24 1159
Ottawa, Can., June 25 ..... (n) 47
Ceccano, Italy, Nov. 20, evening express from Rome to Naples ..... (n) 1159
Central of Georgia Ry., Eufaula, Ala., Nov. 13 ..... (n) 1055
Central Vermont Ry., Waterbury, Vt., Oct. 6 ..... (n) 779
Chesapeake & Ohio Ry., Fulton, Ind., June 18 ..... (n) 90
Chicago, Milwaukee & St. Paul Ry.:
Clinton, Ia., June 22 ..... (n) 90
Madison, Wis., Oct. 6 ..... (n) 780
Cleveland, Cincinnati, Chicago & St. Louis Ry.:
Hammond, Ind., Aug. 21 ..... (n) 434
High railway speeds and wheel failures ..... 1177, (ed) 1195
Report of Interstate Commerce Commission on the derailment near Stockwell, Ind., on Jan. 7, 1913 ..... 1177, (ed) 1195
Comparison of railway casualties in Great Britain and in the United States ..... (ed) 671, 1132
Darnow, Austria, Dec. 16 ..... (n) 1259
Delaware, Lackawanna & Western R. R., Corning, N. Y., July 4 ..... (n) 47
Denver & Rio Grande R. R., Newcastle, Colo., July 9 ..... (n) 132
Duluth & Iron Range R. R., Colby, Minn., July 22 ..... (n) 234
England:
Criminal prosecution of careless railway employees in Great Britain. By H. Raynar Wilson, 886, (ed) 877
Midland Ry.:
Aisgill, Sept. 2 ..... (n) 842
Near Hawes Junction, Sept 2. ..... (n) 528
Prosecution of engine runners passing danger signals. (ed) 877, 886
Erie R. R.:
Hammond, Ind., Aug. 21 .... (n) 434
West Nutley, N. J., July 27 .. (n) 234

PAGE

ACCIDENTS: Railway Accidents: (Cont.)
Great Britain, Accidents to passenger trains ..... (ed) 671, 1132
Great Northern Ry., Mukilteo, Wash., Sept. 22 ..... (n) 683
Jasper, Ala., Sept. 18 ..... (n) 635
Long Island R. R.:
College Point, L. I., Sept. 22, (ns) 635, 1259
Train obstructed by forest tent caterpillars ..... (n) 132
Louisville & Nashville R. R.:
Hays Mills, Ala., Oct. 1, 1912, Broken rail the cause of *604
Marietta, Ga., Aug. 6 ..... (n) 323
Marseilles-Paris Express, near Melun, France, Nov. 4 ..... (n) 989
Michigan Central R. R., Jackson, Mich., July 13 ..... (n) 185
Mobile & Ohio R. R.:
Inherent defect in the time interval system of railway operation ..... (let) *130
State Line, Miss., Oct. 10 ..... (n) 842
New York Central & Hudson River R. R., Buffalo, N. Y., June 17 (n) 47
New York, New Haven & Hartford R. R.:
Bumper torn away in South Station, Boston, Mass., Dec. 16. (n) 1259
Stamford, Conn., Investigation of rear collision of June 12; Investigation of financial and other matters ..... (ed) 126
Steel passenger cars and safe railway practice ..... (ed) 564
Wallingford, Conn., Sept 2 ... (n) 484, (ed) *520, *525, 564
Westerly, R. I., Oct. 26 ..... (n) 891
Westfield, Conn., Oct. 10 ..... (n) 779
New York subway, Dec. 4 ..... (n) 1208
Panama R. R., near Panama .... (n) 989
Pennsylvania R. R.:
Leetonia, O., Aug. 22 ..... (n) 434
Program for handling wrecks prepared for each division ..... (n) 928
Pittsburgh, Fort Wayne & Chicago R. R., Leetonia, O., Aug. 22 ... (n) 434
Prevention of:
Accidents to railway employees fruits of carelessness ..... (ed) 467
Rail failures in 1912: Statistics of Rail Committee, American Railway Engineering Association 876
Railroad tunnel collapsed near Chemnitz, Germany, Dec. 15 ..... (n) 1259
Rock Island Southern Ry., Maynard, Iowa, Sept. 1 ..... (n) 528
Underlying cause of accidents in the Pennsylvania R. R. investigation. 81
Saugatuck, Mich., Steamboat collapsed Aug. 6 ..... (n) 386
Scaffold gave way on Baltimore building, July 7 ..... (n) 132
Shipwrecks:
Battleship "Oden" struck gunboat "Urd" off Swedish coast ..... (n) 434
"Burgomeister Hackman." Bush Terminal, Brooklyn, N. Y., Aug. 28, (n) 484
Coal bunker on "Jan van Nassau" on fire four days ..... (n) 989
Coasting steamer "Rangor" destroyed by fire, July 23 ..... (n) 234
Damage caused by severe storm on the Great Lakes, Nov. 11 .... (n) 1056
Falling steel shaft sank ship in East River, Dec. 8 ..... (n) 1260
German ship "Kalymos" destroyed by fire, Oct. 31 ..... (n) 946
Hudson Bay supply ship "Blothic," Newfoundland, July 21 ..... (n) 234
"Imperator" on fire, Hoboken, N. J., Aug. 28 ..... (n) 484
Inert gases for fighting fire at sea. 1235, (ed) 1246
Loss of the "Volturno" and lifeboat equipment of ships. (ed) 769 (n) 780
"Louisiana"; Newport, R. I., July 2 ..... (n) 132
"Mohawk," Tompkinsville, S. I., June 27 ..... (n) 47
Ohio River towboat "Alice," Corsonolis, Penn., Aug. 30 ..... (n) 528
Recent disasters to lake shipping, (ed) 1141
Raising a wrecked Atlantic liner by compressed air 419
"Scotsdyke," of Glasgow, English Channel, Nov. 19 ..... (n) 1159
"State of California," Juneau, Alaska, Aug. 17 ..... (n) 434
"Titanic," Injury to the hull of the U. S. S. "Arkansas" similar to wreck of *439
"Volturno," Burned at sea, Oct. 11, (ed) 769, (n) 780
Steel chimney collapsed; Workington, England, Sept. 16 ..... (n) 683
Steel chute fell at Baltimore, Md. (n) 635
Subway accidents, New York City, Dec. 4 ..... (n) 1208
Underlying cause of accidents in the Pennsylvania R. R. investigation, (ed) 81
Vandalia R. R., Centerton, Ind., Aug. 12 ..... (n) 386

PAGE

ACCIDENTS: (Continued)
Welland Canal locks, Season's third break. By Emile Reed Low 323
Windstorms, Damage caused by severe storm on the Great Lakes, Nov. 11 ..... (n) 1056
Winnipeg, Man., Grain elevator sinks into the ground, Oct. 18 .... (ns) 892, *944, 1107
Wooden derrick boom broke, Broadway and 37th St., New York City, Nov. 29 ..... (n) 1208
Accounting, Uniform accounting systems for public utilities in New Jersey, (n) 36
Acetylene for lighting block signals tried by the Boston & Maine R. R. at Reading, Mass., and the Chicago Great Western R. R. at Maywood, Ill. ..... (n) 29
Acid-proof mine pump ..... (n) 1017
Adding machines, Locking devices for calculating and adding machines, (n) 614
Adobe bricks, Tests on the strength of adobe brick ..... (n) 1035

ADVERTISING:
Advertising an "institute of efficiency," (ed) 1037
Illustrating the need of a code of ethics for engineers ..... (ed) 31

AERIAL NAVIGATION:
Aeroplane crossed Baltic Sea, June 25 ..... (n) 47
France, Speed of Maurice Provost at Rheims race ..... (n) 683
Hydro-aeroplane trip around the British Coast attempted by Harry G. Hawker ..... (n) 484
Monoplanes faster than biplanes, Rheims, France ..... (n) 733
Stability of the aeroplane demonstrated at aerodome, Buc, France, (n) 528

AGRICULTURE:
"Dry farmers" plan waterway from source of Missouri River to Texas, (n) 1244
Dynamite for subsoiling agricultural lands ..... (n) 1188
Engineering principles applied to farm irrigation. By A. L. Harris ... *1172
Irrigation water-supply from the Pima Indians. By Arthur P. Davis ... *956
Kelp as a source of potash and as a fertilizer ..... (n) 1171
Phosphate resources of the United States ..... (n) 107
Private irrigation project as an investment. By Thomas Berry 854
Utilizing water to produce nitrates for fertilization ..... (n) 1052

AIR COMPRESSORS:
Angle-compound air compressor; built by the Sullivan Machinery Co., of Chicago *1127
Design for low-service rotary vacuum and air-compressor pumps; Nash low-service air pump *1010
Economies on small rock-drilling jobs. 1305
Air pressure, Simple rule for inflating pneumatic tires ..... (n) 659
Air pumps, Rotary high-vacuum air pump; Thyssen design *1125
Air washers, Studies in air washing; condensed from a paper read before the Sanitary Engineering section of the American Public Health Association at Colorado Springs, September, 1913 571
Alaska, Comments by Secretary Lane on conservation; Annual report of the Secretary of the Interior (ed) 1312
Alcohol, Storing and handling inflammable liquids; Martini & Huneke safety system for *1011
Algae, Trouble with micro-organisms in the mechanical filters of Louisville, Ky. By Frederick H. Stover 51
Alkali, Action of alkali and sea water on concrete; the U. S. Bureau of Standards report 50

ALLOYS:
Heat-treated steel and alloy steel in locomotive construction; Committee report, American Master Mechanics Association 30
Report of committee; American Society for Testing Materials 39
Vanadium steel in locomotive construction. By George L. Norris 634
Work in nonferrous metals at the Bureau of Standards; Extracts from a paper by Dr. G. K. Burgess, Chief of the Division of Metallurgy, Bureau of Standards, before the American Institute of Metals 805
Alum. (See Water purification.)
Ambulances, Motor vehicle for relief work at mines *1079
American Electric Railway Association, Annual convention, Atlantic City, N. J., Oct. 13-17, 1913 837

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

American Foundrymen's Association, Annual meeting, Chicago, Oct. 13-16 827
American Institute of Electrical Engineers, Annual convention, June 23-27 77
American Institute of Metals, Annual meeting, Chicago, Oct. 13-16..... 827

AMERICAN PUBLIC HEALTH ASSOCIATION:
Abstract of papers, Annual meeting, Colorado Springs, September, 1913 570
Committee reports on sewerage and sewage disposal and on river cleaning 759
American Railway Bridge and Building Association, Annual convention, Montreal, Oct. 21-23..... 889
American Railway Engineering Association, Rail failures in 1912; Statistics of Rail Committee..... 876
American Road Builders' Association, Annual convention, Philadelphia, Penn., Dec. 9-12.....1256

AMERICAN ROAD CONGRESS:
Resolutions adopted at Detroit....(n) 780
Third annual congress, Detroit; Brief abstract of proceedings..... 726

AMERICAN SOCIETY FOR TESTING MATERIALS:
Annual meeting, June 24-28, 1913..37, 74
Application of specifications; Presidential address. By Robert W. Hunt. 20

AMERICAN SOCIETY OF CIVIL ENGINEERS:
Engineers' Committee to draft a federal water law.....(ed) 934
Making membership in an engineering society a tangible asset..(ed) 369, (lets) 524, 772, 774, 1042, 1315
American Society of Engineering Contractors; Some general principles applicable to public construction contracts 1017
American Society of Engineer Draftsmen, Fraternal American engineering society. By Walter M. Smyth.....(ed) 369, (let) 772

AMERICAN SOCIETY OF MECHANICAL ENGINEERS:
Annual meeting, New York City, December, 1913.....1200
Code of ethics for the engineering profession approved by the Society by a letter-ballot vote.....(ed) 1195
Joint meeting with Verein Deutscher Ingenieure, Leipzig, June 23-25... 121
Tour in Germany..... 161
American Society of Municipal Improvements, Twentieth annual convention, Wilmington, Del., Oct. 7-10. 776

AMERICAN WATER WORKS ASSOCIATION:
Annual convention, June 23-27..... 42
New constitution.....(ed) 35
Standard specifications for waterworks, hydrants and valves..... 265

APPRENTICE SYSTEMS:
Apprenticeship course in signal engineering established by Union Switch & Signal Co.....(n) 196
Papers at annual meeting of the American Institute of Electrical Engineers 78
Vocational schools to be assisted by State of Pennsylvania.....(n) 595

AQUEDUCTS:
Los Angeles, Calif.:
Aqueduct and municipal debt problem .....(ed) 32
Completion, testing and dedication of the aqueduct. By Burt A. Heinly *920
Completion of the Los Angeles Aqueduct; Brief description of the works with some reference to the historical details and a concrete explanation of the plans of operation and the future economic importance.....(lets) 318, 1095
New York Water Supply:
Catskill:
Camp Hill View sanitation; General description; Sanitary conveniences; Sanitary clauses of the contract; Carrying out of the sanitary measures. By Arthur W. Tidd.....*752
Cast-steel dome for the drainage shaft of the Hudson River siphon; Description of and method of manufacture and transportation *696
Device for measuring the inflow of water into shafts.....(n) *1308
Fall of rock from roof of tunnel near Shaft 2, Mosholu Parkway and Jerome Ave., New York, Aug. 1.....(n) 323

PAGE

AQUEDUCTS: New York Water Supply: Catskill: (Continued)
Headings of aqueduct tunnel under East River met Sept. 27, (n) 733
City tunnel, Blasting accident, Shaft 20, Catskill Aqueduct tunnel .....(n) 323
New York State barge canal crossing of Oak Orchard Creek, Medina, N. Y. By Noble E. Whitford....*192
Washington, D. C., Preservation and repair of Cabin John bridge; Washington Aqueduct, District of Columbia 67
Winnipeg, Man., Proposed Shoal Lake or Greater Winnipeg aqueduct, 628, (n) 635

ARBITRATION:
Arbitration of differences between City of Cleveland and Cleveland Ry. Co. completed and report presented .....(n) 262
New law for railway arbitration..(ed) 175

ARCH CENTERING:
Colorado Street reinforced-concrete arch bridge over the Arroyo Seco, Pasadena, Calif.....*146
Halen reinforced-concrete bridge, Bern, Switzerland; Details of centering for 286-ft. arch.....*531

ARCH DESIGN:
Graphical method for dividing the neutral axis of an arch.....*1310
Graphical method of dividing neutral axis in concrete arch design. By T. A. Smith.....*611, (n) 822

ARCHES:
Brick, Question of stability. By J. H. Gandolfo .....(let) *372
Combination concrete and cast iron for columns and arch ribs.....*864
Concrete:
Carondelet Park bridge; Flat circular reinforced-concrete arch supported by cellular abutments with spread footings; Approach retaining walls; Railings; Monumental pylons, Cornices and railings embellishing the structure. By Charles W. Martin.....*646
Colorado Street bridge over the Arroyo Seco, Pasadena, Calif.....*146
Graphical method of dividing neutral axis in concrete arch design. By T. A. Smith.....*611, (n) 822
Internal temperature range in concrete arch rings.....(n) 174
Longest concrete arch; Langwies, Switzerland.....(ed) 269, (n) 277
Structural steel reinforcement of a 125-ft. concrete arch fell, July 11, (n) 234
Switzerland, Halen reinforced-concrete bridge, Bern; main arch 286-ft. span.....*531
Switzerland, Two large concrete arches on a Swiss mountain railway; 315-ft. Langwies arch; Grundje-Tobel bridge, Chur-Arosa Railway *1294
Three-hinged skew arches of reinforced concrete over the Berlin-Spandau canal, Germany....(n) 1127
Validity of Luten patents on concrete bridge construction to be tested in Federal Court of Des Moines, Iowa.....(n) 574
Failure of partially constructed groined arch roof, Baltimore, Md. By Ezra B. Whitman.....*1101
Fire, load and water test upon cinder-concrete, terra-cotta and gypsum floor arches. By Harold Perrine. *374
Masonry, Cabin John bridge; Preservation and repair of; Washington Aqueduct, District of Columbia.. 67
Pont Notre-Dame reconstruction, Paris, France; Arch replacement under traffic *1211
Steel:
Hell Gate Bridge, New York City, Progress on construction work.(n) 90
Large arch-truss drill-hall; Roof carried by a series of three-hinged arch trusses of novel design and construction; Armory for the University of Illinois, Urbana, Ill...*1182
Steel bridge of continuous-arch type, Marburg, Germany.....(n) 887
Strain-gage measurements of stresses in arches .....(n) 1308

ARCHITECTURAL COMPETITIONS:
Australian capital competition....(n) 990
Australian capital, Politician's control of engineering activities; Sadly confused competition for new design of the new capital city..(ed) 563
Needed reform in the conduct of engineering competitions..(ed) 311, 324

PAGE

ARCHITECTURE:
Art of city planning; a monopoly of the architectural profession..(n) 573
Panama-Pacific International Exposition of 1915, at San Francisco, Calif.:
Construction work, site, planning, decoration and architectural and engineering design of the buildings. By A. H. Markwart.....*895
Electric light and power; gas, steam and compressed air; Sewers and sanitary equipment; High-pressure fire-protection; Roads and pavements. By A. H. Markwart.*1070
Areas, Weighing the plot as a means of measuring land areas.....(n) 172

ASPHALT:
Increasing production of asphalt from petroleum .....(n) 293
Natural asphalt deposits in California. 937
Portable asphalt mixing plant; Springfield, Mass.....*420
Association of Railway Electrical Engineers, Annual meeting, Chicago, Oct. 21-24..... 888

AUSTRALIA:
Architectural competition for capital, (n) 990
Australian Circumferential Railway under construction.....(n) 768
Capital city; Politician's control of engineering activities; Sadly confused competition for new design of the new capital city.....(ed) 563
Automatic carrier railways, Experimental electric carrier railway plant at Paterson, N. J.; for rapid transfer of mail and express. System of American Pneumatic Service Co. and Cambridge demonstration plant.....*637, *702
Automatic sprinklers as life savers. By Sidney G. Koon.....(let) 373
Automobiles. (See Motor vehicles.)
Avalanches. (See Accidents, Landslides.)

B

BACTERIA:
Efficiency of coagulating basins at St. Louis, Mo., water-works.....*396
Gelatin and agar bacterial counts for controlling filter operation; Annual convention of the American Water Works Association..... 44
Recent investigations of the bactericidal, deodorizing and physiologic action of ozone.....(ed) 1092, 1096, (let) 1319
Studies in air washing; Condensed from a paper read before the Sanitary Engineering section of the American Public Health Association at Colorado Springs, September, 1913..... 571
Ballast and ballasting; Cleaning stone ballast by screening; Experiments with screens instead of forks for cleaning, on the Baltimore & Ohio R. R., in 1912. By W. I. Trench. *453
Bank vaults; Bank vault of the Guaranty Trust Co. of New York City.....*262

BARGES:
Inland navigation barges with producer-gas engines; Alabama & New Orleans Transportation Co. to operate between the coal fields of Alabama and the city of New Orleans, La.....*1109
Large steel car floats constructed for New York, New Haven & Hartford R. R. for use in New York harbor, (n) 635
Reinforced-concrete pontoon crane, 100x43 ft., constructed at Marseilles, France.....(n) 477
Barrels; Concrete water barrels for railway bridges .....(n) 364
Basalt; Basalt facing for concrete wall, Hamburg Harbor, Germany..... 929

BEACH RECLAMATION:
Atlantic City, N. J., Channel and beach-maintenance problem; Absecon Inlet on the north shore of Atlantic City, N. J.; Method of maintaining channel without injury to the beach by dredging only. By R. R. Raymond..*150, (let) 523
Problem in beach reclamation and a prize for its solution.....*304

BEAMS:
Concrete, Economical concrete columns and girder designed after Joint Committee's prescriptions...(lets) .....*886, 1042, (n) 1251
Design:
Chart for determining the section moduli of floor beams.....*174
Loading formulas for crane-girders, (n) 815

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

BEAMS: (Continued)
Office building of the Consolidated Gas Co., New York City; Details of unusual features; construction methods, etc. *1275
(See also Plate girders.)
Beavers; Flood prevention by means of, (n) 86
Belgium: How the Belgian iron industry maintains itself under international competition. (ed) 717
Belt conveyors. (See Conveyors.)
Berlin, Germany, "Verband Gross-Berlin," a new form of metropolitan government 310
Bids and bidders. (See Contracts and contractors.)
Bins. (See Walls and bins.)

BITUMEN:
Peculiar explosion at Hebburn-on-Tyne, England, due to formation of inflammable gas by the destructive distillation of bituminous insulation on buried electric wires, (n) 553
(See also Pavements.)

BLAST FURNACES:
Oxygen for enriching the air supplied to iron blast furnaces to be tried by the Ougree-Marihave Co., of Belgium (n) 560
Retaining walls of molten slag at Butte (Mont.) reduction works, (n) 568
Blast furnace slag, Slag foundation for a 305-ft. steel chimney; Calumet & Arizona Mining Co., Douglas, Ariz. By C. W. Cromwell. *1167
Blasting, Protecting plate-glass windows against blasting operations; New York subway 1305
Blasting accidents. (See Accidents.)

BLOWERS:
Fan wheels as dynamometers used successfully by Buffalo Forge Co. (n) 265
Two large forced draft blower sets installed at Providence, R. I. power plant (n) 716

BLUEPRINTS:
Automatic blueprint finisher (n) 364
Cost data on blueprinting. By Frank H. Jones. 612, (n) 823
Boat-ways, Reinforced-concrete boat-ways, Rockhaven Harbor, N. D., for Missouri River Fleet of United States Engineer Corps. By S. R. Morrow *645
Boats. (See Barges.)
Boiler explosions. (See Accidents.)

BOILERS:
Locomotive with water-tube boiler tried by Prussian State Railways, (n) 80
Performance tests under forced firing on a 736-hp. Edgemoor water-tube boiler (n) 575

BONDS:
Age of extravagance; National debts, (n) 1175
Federal control of stock and bond issues (ed) 935
General advance in the interest rate on bond issues of all classes. (ed) 1091
Los Angeles, Calif., Aqueduct and municipal debt problem (ed) 32
Pennsylvania, Fifty million dollar bond issue defeated (n) 989
Pennsylvania vote on a $50,000,000 bond issue for good roads (ed) 986
Private irrigation project as an investment. By Thomas Berry 854
Some reasons for the increase in public debt and the raising of tax rates (ed) 221

BOSTON, MASS.:
Builders' license law; ordinance for the control of building operations. 640
New subway under construction *1190
South Station, the busiest railway terminal in the country (n) 635
Breakwaters, Silting of harbors and effect of piers and jetties upon the movements of sand (n) 644

BRICK:
Adobe, Tests on the strength of adobe brick (n) 1035
National Paving Brick Manufacturers' Association, annual meeting, Cleveland, Ohio, Sept. 17. 633
Report of committee; American Society for Testing Materials. 40
Bridge accidents. (See Accidents.)
Bridge bearings, Observations on bridge expansions: Series of observations of steel railway bridges erected on various lines of the New York, New Haven & Hartford R. R. By H. A. Loser *1170

PAGE

BRIDGE DESIGN:
Aesthetic design for drawbridges; Design for direct-lift, double-deck drawbridge over the Chicago River at Michigan Ave., showing proposed architectural treatment of the towers *926
Bridge specification for highway bridges, intended to aid "local highway officials in fixing requirements to which bridges must conform" issued by the United States Office of Public Roads (n) 507
Chicago, Ill., Direct-lift drawbridges without cables (lets) 36, 225
Equivalent uniform loads on bridges for different types of engine *824
General method for drawing influence lines for stress in simple trusses. By C. A. Melick (let) *129
Largest cantilever bridge, Latest bridge design for Sydney harbor, N. S. W.; the third largest span in the world 220
Observations on bridge expansion; Series of observations of steel railway bridges erected on various lines of the New York, New Haven & Hartford R. R. By H. A. Loser *1170
Shear and rivet diagram for railway plate-girders *823
Some necessary precautions in the design and supervision of construction of low-truss steel highway bridges. By G. M. Braune 398

BRIDGE ERECTION:
Broadway bridge over Willamette River, Portland, Ore., with Rall bascule span. By W. P. Hardesty. *704
Derrick cars for 169
Method of erecting the 210-ft. trusses for the Calumet River lift bridge of the Pennsylvania R. R., South Chicago, Ill. By W. J. Howard *500
Progress on the Lower Ganges bridge, Northern Bengal, India. By M. D. Brayshay *460
Transferring a draw span and a fixed span of the Wabash R. R. bridge over the Mississippi River at Hannibal, Mo. *1128
Bridge floors, Forth Bridge floor repairs (n) 892

BRIDGE LOADINGS:
Equivalent uniform loads on bridges for different types of engine *824
Summit cutoff of the Delaware, Lackawanna & Western R. R.; Details of the new line and its structures *410

BRIDGE RENEWALS:
Emergency bridge reconstruction; Baltimore & Ohio R. R. *87
Forth Bridge floor repairs (n) 892
Moving a three-span truss bridge; Shifting of the Missouri Pacific Ry. bridge over the Kaw River at Kansas City. By C. E. Smith *54
Pont Notre-Dame reconstruction, Paris, France; Arch replacement under traffic *1211
Reconstruction of the old chain bridge at Newburyport, Mass. By Edward C. Sherman *585
Reconstruction of the Sibley, Mo., bridge over the Missouri River. (n) 665
Reinforcing an old cantilever bridge, Philadelphia, Penn. By Henry H. Quimby *487
Repairs to the So. Halsted St. lift bridge over the Chicago River. By E. E. Howard. (let) 371
Replacing a timber Howe truss with a long-span plate-girder; Bad River crossing, Duluth, South Shore & Atlantic Ry., near Shilo, Wis. *1303
Timber trestle 3500 ft. long and varying from 30 to 40 ft. in height across Newark Bay, in New Jersey, Rebuilt in eleven days and six hours (n) 168
Transferring a draw span and a fixed span of the Wabash R. R. bridge over the Mississippi River at Hannibal, Mo *1128

BRIDGES:
Abutments. (See Abutments.)
Atchison, Topeka & Santa Fe Ry., Reconstruction of Sibley, Mo., bridge over the Missouri River. (n) 665
Baltimore & Ohio R. R., Emergency bridge reconstruction *87
Barnstable, Mass., Small bascule highway draw span *166, *665
Bosphorus, Bridging the Bosphorus and the Golden Horn at Constantinople. By H. G. Tyrrell *1020
Cabin John, Preservation and repair of; Washington Aqueduct, District of Columbia 67
Cantilever bridge built by boy scouts, (n) *614

PAGE

BRIDGES: (Continued)
Chicago, Ill., Double-deck bascule bridge to be built over the Chicago River at Michigan Ave., *116, (erratum) 274
China, Yellow River bridge, Tientsin-Pukow Ry. *595
Collection and use of construction cost data on 1305
Cologne, New bridge over the Rhine. By Charles J. Kavanagh *845
Colorado St. bridge, Pasadena, Calif., formally opened Dec. 13 (n) 1259
Concrete, Validity of Luten patents on concrete bridge construction to be tested in Federal Court of Des Moines, Iowa (n) 574
Concrete water barrels for railway bridges (n) 364
Constantinople:
Bridging the Bosphorus and the Golden Horn. By H. G. Tyrrell. *1020
New bridge over the Golden Horn. By F. C. Coleman *1018
Continuous arch type, Steel bridge, Marburg, Germany (n) 887
Derrick cars for bridge erection 169
Drawbridges:
Aesthetic design for drawbridges; Design for direct-lift, double-deck drawbridge over the Chicago River at Michigan Ave., showing proposed architectural treatment of the towers *926
Chicago, Ill.:
Double-deck bascule bridge to be built over the Chicago River at Michigan Ave. *116, (erratum) 274
Repairs to the So. Halsted St. lift bridge over the Chicago River. By E. E. Howard (let) 371
Cost of a cable-lift drawbridge (n) 973
Direct-lift drawbridges without cables; Operating machinery. (let) 36, 225
Electrical equipment of drawbridges; Specifications submitted, Association of Railway Electrical Engineers 888
Fort William, Ont., Long-span double-deck bascule drawbridge across Kaministiquia River carrying Canadian Pacific Ry. *308
Fraser River, B. C., Grand Trunk Pacific Ry.; Direct-lift span combined railway and highway bridge, (lets) 36, 225
Gearing for operating a 36-ft. bascule bridge by hand *665
Pine Bluff, Ark., Direct-lift drawbridge (Strauss system). (lets) 36, 225
Pontoon bridge over the Golden Horn. By F. C. Coleman *1018
Portland, Ore., Broadway bridge over Willamette River, with Rall bascule span. By W. P. Hardesty. *704
Small bascule highway draw span; Barnstable, Mass. *166, *665
South Chicago, Ill., Method of erecting the 210-ft. trusses for the Calumet River lift bridge of the Pennsylvania R. R. By W. H. Howard *500
Steilacoom Creek bridge, Northern Pacific Ry.; Direct-lift bridge near Tacoma, Wash. (lets) 36, 225
Toledo, Ohio, Electric car suspended by rear trucks from pier, Oct. 31, (n) 989
Vertical-lift drawbridges without cables (let) 36
Duluth, South Shore & Atlantic Ry.; Replacing a timber Howe truss with a long-span plate-girder; Bad River crossing, near Shilo, Wis., (n) 1260, *1303
Fire on the Harriman Bridge, Portland, Ore. By John W. Cunningham (n) 323, *376, (erratum) 525
Fort William, Ont., Long-span double-deck bascule drawbridge across Kaministiquia River carrying Canadian Pacific Ry. *308
Forth Bridge, Scotland, Floor repairs, (n) 892
Golden Horn, Bridging the Bosphorus and the Golden Horn at Constantinople. By H. G. Tyrrell *1020
Hannibal, Mo., Transferring a draw span and a fixed span of the Wabash R. R. bridge over the Mississippi River *1128
Highway:
Bridge specification for highway bridges intended to aid "local highway officials in fixing requirements to which bridges must conform" issued by the United States Office of Public Roads (n) 507
Bridges and culverts for country roads; Paper before American Road Congress. By A. R. Hirst 729
Harrisburg, Penn., Failure of a small highway bridge by breaking of a timber tension chord; Harrisburg, Penn *1044

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

BRIDGES: Highway: (Continued)
Partial failure of a light highway bridge. By F. Tissington....*904
Some necessary precautions in the design and supervision of construction of low-truss steel highway bridges. By G. M. Braune.. 398
Idaho Northern Ry., Extension of 103 miles from Emmett north to Big Payette Lake. By J. H. Smith..*101
India, Progress on the Lower Ganges bridge, Northern Bengal. By M. D. Brayshay....*460
Kansas City, Mo., Railway terminal system of Kansas City, Mo.....*237
Marburg, Germany, Steel bridge of continuous-arch type.....(n) 887
Memphis, Tenn., Cantilever bridge over the Mississippi River at Memphis, Tenn.; Arkansas & Memphis Railway Bridge & Terminal Co., Ralph Modjeski, Consulting Engineer...*930
Missouri Pacific Ry., Moving a three-span truss bridge over the Kaw River at Kansas City. By C. E. Smith *54
Missouri River, Reconstruction of the Sibley, Mo., Bridge.....(n) 665
Moving a three-span truss bridge; shifting of the Missouri Pacific Ry. bridge over the Kaw River at Kansas City. By C. E. Smith.... *54
Nashville, Chattanooga & St. Louis Ry., Grade reduction and double tracking *802
Newburyport, Mass., Reconstruction of the old chain bridge. By Edward C. Sherman *585
New London, Conn., Borings for new Thames River bridge.....(n) 528
New York City, East River, Hell Gate, Progress on construction work, (n) 90
Observations on bridge expansions; Series of observations of steel railway bridges erected on various lines of the New York, New Haven & Hartford R. R. By H. A. Lozer.*1170
Oregon-Washington R. R. & Navigation Co., Bridge to be built across Spokane Falls.....(n) 1331
Paris, France, Pont Notre-Dame reconstruction; arch replacement under traffic.....*1211
Pasadena, Calif., Colorado Street reinforced-concrete arch bridge over the Arroyo Seco, Pasadena, Calif.*146
Payette River, Extension of 103 miles from Emmett north of Big Payette Lake; Idaho Northern Ry. By J. H. Smith.....*101
Philadelphia, Penn., Reinforcing an old cantilever bridge. By Henry H. Quimby *487
Philippine Islands, Provincial public works organization and its engineering personnel. By E. J. Westerhouse *958
Pincher, Alta., Remarkable suspension bridge. By D. J. McLachlan, (let) *274
Pontoon, New bridge over the Golden Horn at Constantinople. By F. C. Coleman.....*1018
Portland, Ore., Broadway bridge over Willamette River, with Rall bascule span. By W. P. Hardesty..*704
Quebec, Progress of work on new Quebec Bridge.....(n) 990
Rahway, N. J., Grade elevation and six-tracking; Pennsylvania R. R. By John Jervis Vail.....*1118
Richmond, Va., James River, Needed reform in the conduct of engineering competitions....(ed) 311, (n) 324
Sibley, Mo., Reconstruction of bridge over the Missouri River..... (n) 665
Some necessary precautions in the design and supervision of construction of low-truss steel highway bridges. By G. M. Braune..... 398
South Chicago, Ill., Method of erecting the 210-ft. trusses for the Calumet River lift bridge of the Pennsylvania R. R. By W. J. Howard..*500
Spokane, Wash.:
Bridge to be built by the Oregon-Washington R. R. & Navigation Co. across Spokane Falls....(n) 1331
Self-draining foundation pit on the bank of a river; Excavation of piers at the Oregon-Washington R. R. & Navigation Co.'s viaduct across the Spokane River, Spokane, Wash. By John W. Cunningham *1024
St. Louis, Mo., Carondelet Park bridge; Flat circular reinforced-concrete arch supported by cellular abutments with spread footings. By Charles W. Martin.....*646
Suspension dumping bridge for building railway embankments.....*1024
Suspension:
Cologne bridge over the Rhine. By Charles J. Kavanagh.....*845

PAGE

BRIDGES: Suspension: .(Continued)
Reconstruction of the old chain bridge at Newburyport, Mass. By Edward C. Sherman.....*585
Remarkable suspension bridge; Pincher, Alta. By D. J. McLachlan.....(let) *274
Switzerland:
Halen reinforced-concrete bridge, Bern; Main arch 286-ft. span....*531
Langwies, Reinforced-concrete arch under construction; 330-ft. span, (ed) 269, (n) 277
Large concrete arches on a Swiss mountain railway; 315-ft. Langwies arch; Grundje-Tobel bridge, Chur-Arosa Railway.....*1294
Sydney, N. S. W., Latest bridge design for Sydney harbor; the third largest span in the world..... 220
Timber trestle 3,500 ft. long and varying from 30 to 40 ft. in height across Newark Bay, in New Jersey, rebuilt in eleven days and six hours .....(n) 168
Temporary, Grade elevation and six-tracking at Rahway, N. J.; Pennsylvania R. R. By John Jervis Vail *1118
Vancouver, B. C., Georgia-Harris viaduct; a succession of concrete-encased steel Warren trusses, "mushroom" slabs, reinforced-concrete girders and steel-frame cantilevers; designed by C. A. P. Turner *344
Brooklyn Engineers Club, Problem in beach reclamation and a prize for its solution *304

BUCKETS:
Electric-motor operated clam-shell buckets *168
Improvised bottom dump concrete bucket .....(n) *1036

BUFFERS:
Stronger buffers needed for railroad terminals.....(ed) 519, *526
Timber buffers for protecting vessels entering the Panama Canal locks *306
Building accidents. (See Accidents.)

BUILDING CONSTRUCTION:
Automatic revolving door, collapsible in case of panic.....(n) 555
Bank vault of the Guaranty Trust Co. of New York City.....*262
British Columbia, Production of building materials in 1912.....(n) 465
Builders' license law for the city of Boston, Mass.; Ordinance for the control of building operations.... 640
Building with traveling tower-cranes, *814, (n) 1310
Bureau of Engraving and Printing, Washington, D. C.; a modern high-class factory building, 505 ft. by 300 ft. By Fred W. Lepper.....*335
Cinder-concrete wall lining used on exterior walls of Deutsches Museum at Munich .....(n) 613
Dome of the Wisconsin capitol; Steel tower which forms the support or substructure of the dome, rising from the foundations and carrying the dome independently of the main portion of the building....*389
Erection work on a heavy printing house; Hill Publishing Co., New York City.....*1298
Expansive power of water-soaked wood .....(n) *615
Expediting progress on "rush" construction work. By James L. Stuart 818
Fire, load and water test upon cinder-concrete, terra-cotta and gypsum floor arches. By Harold Perrine.*374
Freight terminal for the "Soo Line," Chicago, Ill.....*378
German "ladder" staging.....*606
Granting of licenses to builders by the Board of Examiners in the Building Department of Boston, Mass.....(n) 1259
Guaranty Trust Co.'s new building, New York City; Interesting problems in the foundations and steel construction. By Eugene W. Stern *258
Hoisting heavy girders 250 ft. above the street; Consolidated Gas Co. building *275
Illinois law for licensing mason contractors 813
Large-capacity building derrick; 100-ft. boom.....*166
Life hazard in crowded buildings due to inadequate exits. By H. F. J. Porter.....(ed) 224, *228
Municipal building laws in the United States; a study of the building codes of the leading cities in the United States..... 9

PAGE

BUILDING CONSTRUCTION: (Cont.)
New York City, Advance of structural methods illustrated by the Standard Oil Co.....(n) 946
Office building of the Consolidated Gas Co., New York City; Details of unusual features; Construction methods, etc.....*1275
Panama-Pacific International Exposition of 1915, at San Francisco, Calif.; Construction work, site, planning, decoration and architectural and engineering design of the buildings. By A. H. Markwart *895, *1070
Pneumatic riveting; Continental Bank Building, Chicago, Ill.....(n) 1304
Protecting street traffic from falling objects during building construction *356
Quantity surveying in the United States. By Leslie H. Allen..(ed) 877, (let) 988
Rapid erection of a steel-frame foundry; National Brake & Electric Co., Milwaukee, Wis.....*1025
Safety rules for handling construction materials .....(n) 365
Standard specifications for, entitled "Standard Specifications for Exterior Plastering".....(n) 506
Structural features of a Chicago, Ill., bank building; Continental & Commercial National Bank Co.....*976
Valuation of buildings. By Robert H. Overstreet 516
Warehouses on Made Land, Manila, P. I.; Special concrete foundations in the Manila Port District. By John W. Graham.....*554
What is a proper safe stress for timber.....(lets) 179, (n) 426
Building inspection, Educational trips by engineers in a city department; Borough of Manhattan.....(n) 90

BUILDING LAWS:
Builders' license law for the city of Boston, Mass.; Ordinance for the control of building operations.... 640
Municipal building laws in the United States; a study of the building codes of the leading cities in the United States. By R. Fleming... 9
Building valuation, Valuation of buildings. By Robert H. Overstreet... 516

BUILDINGS:
Boston, Mass., Truss in United States Custom House; Large building truss .....(n) *1036
Cedar Rapids, Iowa, Failure of part of Stark-Lyman Building. By Robert C. Barnett.....*1104, 1254, (let) 1314
Chicago, Ill., Structural features of a Chicago, Ill., bank building; Continental & Commercial National Bank Co.....*976
Germany:
Deutsche Museum at Munich; Cinder-concrete wall lining used on exterior walls of.....(n) 613
Deutsche Museum, Cut surface-finish for concrete.....*358
International Building Exposition, Leipzig, Germany, announces awards .....(n) 1260
Investigation of existing engineering structures. By Horace R. Thayer. 609
London, England:
Engineering society headquarters altered during the past three years, (n) 1023
Society house of Institution of Civil Engineers nearly completed...(n) 525
Madison, Wis., Dome of the Wisconsin capitol; Steel tower which forms the support or substructure of the dome, rising from the foundations and carrying the dome independently of the main portion of the building *389
Massachusetts Institute of Technology, Plans for new buildings.....*1053
Milwaukee, Wis., Rapid erection of a steel-frame foundry; National Brake & Electric Co.....*1025
New York City:
Consolidated Gas Co.:
Hoisting heavy girders 250 ft. above the street.....*275
Office building; Details of unusual features; Construction methods, etc. *1275
Guaranty Trust Co.:
Interesting problems in the foundations and steel construction. By Eugene W. Stern.....*258
Bank vault.....*262
Hill Publishing Co., Erection work on a heavy printing house.....*1298
Mills Building, Underpinning the building, Broad and Nassau Sts. for the new Morgan Bldg.....*257
Philippine Islands, Provincial public works organization and its engineering personnel. By E. J. Westerhouse *958

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

BUILDINGS: (Continued)
Samaritan Hospital, Troy, N. Y., Service equipment of. By C. F. Herington *108
University of Illinois, Large arch-truss drill-hall; roof carried by a series of three-hinged arch trusses of novel design and construction; armory for the University of Illinois, Urbana, Ill.....*1182
Valuation of buildings. By Robert H. Overstreet 516
Washington, D. C., Bureau of Engraving and Printing; a modern high-class factory building, 505 ft. by 300 ft. By Fred W. Lepper.....*335
(See also Railway stations, etc.)

BULKHEADS:
Cairo, Ill., Plank and earth bulkhead wall on river front.....*104
Tile protection for intertidal concrete in sea walls.....*1178
Torrance-Cunningham wharf-bulkhead, Savannah, Ga. By Wm. M. Torrance *710
Typical Hamburg, Germany, quaywall. *938

BUMPING POSTS:
Bumper torn away in South Station of New York, New Haven & Hartford R. R., Boston, Mass., Dec. 16. (n) 1259
Stronger buffers needed for railroad terminals.....(ed) 519, *526

C

Cables, Electric. (See Electric power, Transmission lines.)
Cable railways, Reconstruction of Mahanoy plane, Philadelphia & Reading Ry. By Joseph S. Ward, *1220, (ed) 1247, (erratum) 1322

CABLEWAYS:
Aerial cableway across the Himalaya Mountains, 75 miles long....(n) 928
Arrowrock Dam, Idaho, Excavation for; Drag-line excavator, orange-peel buckets, skips from cableways, hydraulic jets, blasting used in loosening rock. By Charles H. Paul *93
Austria; New passenger cableway in the Tyrolese Alps.....(n) 320
Cableway for railway lumber cars. By M. M. Cooke.....*939
Cableway for unloading cars....1031, (let) 1198
Cableway with side-swinging towers; Longitudinal cableways over pit for construction of lock 1, Rhine-Herne Canal, Germany.....*1034
Device for passing cars on a single-track cableway.....(n) *1310
Landing cableway, Nome, Alaska.....*466
Suspension dumping bridge for building railway embankments.....*1024
Cairo, Ill., Floods and levees at one of the most vulnerable points from a flood standpoint in the Mississippi Valley *104
Caisson disease, New York law governing work under compressed air...307, (lets) 425, (n) 566

CAISSONS:
Cantilever bridge over the Mississippi River at Memphis, Tenn.; Arkansas & Memphis Railway Bridge & Terminal Co., Ralph Modjeski, Consulting Engineer.....*930
Concrete; Harbor construction at Kobe and Yokohama, Japan. By Wilson T. Howe.....*556
Hales Bar dam, Tenn., Sinking caissons for the dam foundation; Plan of caisson arrangement, and profile of dam. By A. H. Horton...*949, (ed) 1038, (let) 1143
New York law governing work under compressed air.....307, (lets) 425, (n) 566
Pneumatic, Foreign requirements governing work under compressed air. By Paul Seurot.....(let) 566
Steel cutting-edges for concrete caissons *1033
St. Lawrence River at Levis, Quebec; Dry-dock of record size, built by the Department of Public Works of the Dominion of Canada....*1214
Calculating machines, Locking devices for calculating and adding machines .....(n) 614
Canal lock gates, Adjustment of the devices of hinge, miter ends and sills of Panama Canal lock gates to prevent leakage.....*744

CANAL LOCKS:
Amount of water required for canal lockage. By C. T. Schwarze..(let) 936
Mississippi lock at Keokuk, Iowa; To enable river traffic to pass the dam; Single lift of 30 to 40 ft., and gate equipment.....*964

PAGE

CANAL LOCKS: (Continued)
Ohio River locks at Louisville, Ky.; Navigation lock independent of the dam, located in a canal which affords passage around "the falls"; Proposed reconstruction of the river dam; Construction plant and methods employed.....*1238
Season's third break in Welland Canal locks. By Emile Reed Low..... 323
Timber buffers for protecting vessels entering the Panama Canal locks. *306

CANALS:
Cape Cod, official opening to be July 4, 1914 .....(n) 1159
Chicago Drainage Canal. (See Sewage disposal)
Inter-Coastal canals along Atlantic Coast, $30,000,000 asked for construction of.....(n) 386
Irrigation. (See Irrigation.)
Keokuk, Iowa, Mississippi lock; To enable river traffic to pass the dam; Single lift of 30 to 40 ft., and gate equipment.....*964
Lining an irrigation ditch with Hess metallic fluming. By Elbert M. Chandler *464
Louisville & Portland Canal; Ohio River locks at Louisville, Ky.; Navigation lock independent of the dam, located in a canal which affords passage around "the falls"; Proposed reconstruction of the river dam; Construction plant and methods employed.....*1238
New York State:
Barge:
Crossing of Oak Orchard Creek, Medina, N. Y., By Noble E. Whitford *192
Operations of the Mohawk River bridge dams. By D. A. Watt, *282, (erratum) 472
Present stage of construction on. By Emile Low..... 561
Panama:
Biographical sketch of David Du Bose Gaillard.....1206
Change in organization and history of the Central Division.....(n) 833
Condensed description of construction in the "Official Handbook" by Joseph Bucklin Bishop.....(n) 1056
Culebra Cut:
Cucaracha slide proves an obstacle in flooding the cut.....(n) 892
Dry excavation in Culebra cut completed Sept. 7.....(n) 575
Grouting process for preventing slides. By A. S. Zinn.....*406
Landscape architecture at....(n) 539
Recent photographs of the canal work *666
Relay pumping station installed for excavation at Cucaracha slide .....(n) 386
Sliding ground in. By Donald F. MacDonald 408
Truth about the Culebra cut slides. By A. S. Zinn.....*406
Dredging; New 15-cu. yd. dipper dredges .....(n) 1056
Extracts from the annual report of the Isthmian Canal Commission *1122
Final stages of construction. By C. T. Schwarze.....(n) 781, (let) 936
First vessel through, "Louise", Nov. 17 .....(n) 1055
Floating cranes for the permanent equipment of the Panama Canal..*118
Flooding of Culebra Cut.....(ed) 769
Gatun Lake rise and rainfall during June and July.....(n) 234
Gatun Lake, Final filling of....(n) 386
Land slide at Portobello quarry, Aug 11.....(n) 386
Lock gates, Adjustment of the devices at hinge, miter ends and sills of lock gates to prevent leakage *744
Locks:
Operating control system.....*1323
Recent photographs of the canal work *666
Timber buffers for protecting vessels entering the locks.....*306
Progress notes.....(ns) 30, 386, 635, 132, 857
Recent photographs of the canal work *666
Record rainfall.....(n) 90
Rules for laying up idle equipment.. 820
Water-supply and purification system; Problems of the Canal Zone reviewed and contrasts with northern water-supply conditions drawn; Pre-coagulation, aeration, sedimentation and mechanical filtration.....*650, (let) 832, *1010
Work on the seagoing suction dredges on the Panama Canal.....(n) 117
Seepage losses from earth canals, *402, (let) *881
Suez, Canal traffic for 1912.....(n) 276

PAGE

CANALS: (Continued)
Welland:
New Welland ship canal; Its relation to the present and to the old canals and details of design and construction *598
Season's third break in canal locks. By Emile Reed Low..... 323
Cannon balls, Breaking quarry stone with a cannon ball.....(n) *822
Capital, High price of capital; Money for productive enterprises hard to get, (ed) 618
Capitols, Dome of the Wisconsin capitol; Steel tower which forms the support or substructure of the dome, Rising from the foundations and carrying the dome independently of the main portion of the building *389
Car dumping machinery, Platform for dumping quarry cars.....*612
Car floats, Four large steel car floats constructed for New York, New Haven & Hartford R. R. for use in New York harbor.....(n) 635
Car lighting, Association of Railway Electrical Engineers; Committee report 888

CAR WHEELS:
High railway speeds and wheel failures.....1177, (ed) 1195
Report of Interstate Commerce Commission on the derailment near Stockwell, Ind., on Jan. 7, 1913; Cleveland, Cincinnati, Chicago & St. Louis R. R.....1177, (ed) 1195

CARS:
Concreting train using a drag-line excavator.....1031, (let) 1198
Derrick cars for bridge erection..... 169
Ditching car; Baltimore & Ohio R. R..*361
Electric tie boring and spiking machine *506
Electric:
Articulated street car put in service by the Virginia Railway & Power Co., Richmond, Va.....(n) 276
Benzol-electric motor train built for the Khedive of Egypt.....(n) 710
Car washing against paint preservation .....(n) 466
Diesel engine electric motor cars on Swedish State Rys.....(n) 605
Maintenance of electric railway equipment. By C. H. Quereau.... 28
Overcrowded street cars; Bill proposing that passengers having to stand pay half fare.....(n) 1181
Self-propelled street cars recommended for municipal tramways, (n) 280
Hopper-bottom steel-frame box cars for grain; Canadian Pacific Ry...*806
Motor cars, American Railway Bridge and Building Association; committee report..... 890
Motor:
Benzol-electric motor train built for the Khedive of Egypt.....(n) 710
Diesel engine electric motor cars on Swedish State Rys.....(n) 605
Pittsburgh Auto Transit Co., Pittsburgh, Penn.; 34-passenger single-deck motor omnibus..... *1
Railroad speeder for fire protection used by the United States Forest Service .....(n) 634
Platform for dumping quarry cars....*612
Portable concreting plant with folding elevator towers; Chicago, Milwaukee & St. Paul Ry....*26, (n) 365
Safety exhibit car for education of employees; New York Central & Hudson River R. R.....(n) 308
Steel underframes for cars and steel box-cars 1202
Steel:
Baking the paint upon passenger cars in order to dry it quickly.(n) 943
Hopper-bottom steel-frame box cars for grain; Canadian Pacific Ry...*806
Steel lunch-counter car in use on Pennsylvania R. R. between New York and Philadelphia.....(n) 1159
Steel passenger cars; Kansas City, Clay County & St. Joseph Ry. By Robert P. Woods.....*888
Steel passenger cars and safe railway practice.....(ed) 564
Strength of; Abstract of report of Committee on Car Construction, Master Car Builders Association.. 30
Two "business cars" being built by the Pennsylvania R. R.....(n) 857
Stronger end construction for Pullman cars designed by Richmond Dean, Gen. Mgr., the Pullman Co....(n) 420
Track inspection car; Erie R. R.; Dynagraph or track-inspection car, which detects irregularities and imperfections; Autographic records of track conditions in diagram form *660
Unloading broken stone or gravel from cars by scraper. By Ralph Bennett *1030

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

CARS: (Continued)
Unloading earth from cars by sluicing. By J. C. Lathrop..... 609
Castings. (See Copper; Iron and steel; Steel; Bronze; Foundry work.)
Caterpillars, Forest tent caterpillars obstructed Long Island R. R. train, (n) 132
Cattle guards, American Railway Bridge and Building Association; Committee report..... 890
Cave-ins. (See Accidents.)

CEMENT:
Action of various substances on cement mortars. By Richard K. Meade.. 21
Artificial marble made with white portland cement.....(n) 1260
Bonus system for the purchase of portland cement.....281, (ed) 312
Damage to bulk cement and sacked cement by wetting in transit. By J. H. Libberton..... 251
German cement prices.....(n) 946
Los Angeles Aqueduct: a rejoinder. By F. C. Finkle.....(let) 1095
Planer shavings and cement used as a plug in tremies for depositing concrete under water.....(n) 1027
Recent developments in the autoclave test for volume constancy of cement. By G. J. Ray...(ed) 82, (let) 272
Report of committee; American Society for Testing Materials..... 40
Retempered mortar as a bond between new and old concrete. By Albert A. Northrop.....(let) 178, (n) 274
Retempered mortar as a finishing coat for concrete surfaces. By Albert A. Northrop.....(let) 178, (n) 274
Rock grouting and caisson sinking for the Hales Bar dam, Tennessee River, Hales Bar, Tenn. By A. H. Horton..*949, (ed) 1038, (let) 1143
Tidewater Portland Cement Co., Baltimore, Md.; Categorical description of a modern cement and hydrated lime plant. By Richard K. Meade *858
Use of cement in bulk; Bloomingdale Road line of the Chicago, Milwaukee & St. Paul Ry. (at Chicago) .....(n) 365
Why not use more cement in concrete. (ed) 879, (lets) 1043

CEMENT MANUFACTURE:
Dust precipitation plant of the Riverside Portland Cement Co., Crestmore, Calif..... 716
Tidewater Portland Cement Co., Baltimore, Md.; Categorical description of a modern cement and hydrated lime plant. By Richard K. Meade *858

CEMENT TESTING:
Action of various substances on cement mortars. By Richard K. Meade.. 21
Autoclave test:
Gave results of a number of tests of cement which has been subjected to the pressure steam test of the autoclave; Report of committee, American Society for Testing Materials..... 40
Recent developments in the autoclave test for volume constancy of cement. By G. J. Ray.....(let) 272
Papers on tests of aggregates; Annual meeting of the American Society for Testing Materials..... 74
Sieve test for cement that insures uniformity in fineness. By G. J. Griesenauer 1296
Suggested improvement in sieve standardization. By Bernard Enright, (let) 524
Chestnut blight, Effect of chestnut blight on timber .....(n) 111

CHICAGO, ILL.:
Arnold report on the terminal situation *1154
City's growth and development hampered by zone or belt of railway terminals around the commercial center; Extensive projects under consideration.....*210, (ed) 222
Garbage-disposal problem reaches acute stage .....(n) 277
Garbage-disposal situation at expiration of contract with Chicago Reduction Co.....(ns) 733, 779
Garbage-disposal situation takes another turn .....(n) 842
Harbor and subway plans..... 395
Present status of the subway situation. By William J. Shanks.....1044
Suggested changes in Chicago railway terminals; Extract from a report by John F. Wallace to the Committee on Railway Terminals of the City Council of Chicago, 923, *1154

PAGE

CHIMNEYS:
Brick, Collapse at Deering plant, International Harvester Co., Chicago, Sept. 29.....(n) 683
Effect of a lightning discharge upon a brick chimney..... *73
Slag foundation for a 305-ft. steel chimney; Calumet & Arizona Mining Co., Douglas, Ariz. By C. W. Cromwell *1167
Steel chimney 400 ft. high of the United Verde Copper Co., Jerome, Ariz. By C. W. Cromwell.....*1114
Steel chimney to increase height of brick chimney.....(n) 743
Steel, Collapse at Workington, England, Sept. 16.....(n) 683

CHINA:
Chinese famine and proposed flood prevention. By Charles Davis Jameson *588
Railway development since 1876..(n) 932
Cincinnati, Ohio, Instructions to field parties for the sub-surface survey of Cincinnati, Ohio.....*1080
Cities, "Districting" cities in America; Minneapolis the first to adopt the plan .....(n) 1229

CITY PLANNING:
Architectural competition for Australian capital.....(n) 990
Art of city planning; a monopoly of the architectural profession...(n) 573
City planning exhibition at New York Public Library, Nov. 24.....(n) 1208
Course in civic design or town planning at University of Illinois, by Charles Mulford Robinson....(n) 946
Exhibition to be held in New York City last week in November.....(n) 946
How to build and improve seaside resorts. By John S. Brodie..... 245
Industrial city of Torrance, Calif.; General layout of the city and its various public improvements described. By Ralph Bennett.....*870
Massachusetts, City and town planning boards to be created by all cities and towns having more than 10,000 population.....(n) 299
Ottawa, Ont., Municipal or district improvement plan prepared.....(n) 90
Panama-Pacific International Exposition of 1915, at San Francisco, Calif.; Electric light and power; gas, steam and compressed air; sewers and sanitary equipment; high-pressure fire-protection water system; fire protection; roads and pavements; Construction buildings and grounds. By A. H. Markwart *895, *1070
Philadelphia, Penn., Suburban metropolitan district created by act of the Pennsylvania legislature..(n) 257
Washington, D. C., Old surveyor's latest solar observation; Street in Washington, D. C., laid out in true meridian. By A. W. Barber..(let) 936

CIVIL SERVICE:
Examinations as a means of determining the fitness of candidates for executive offices in the municipal service, discussed and vigorously advocated at the recent Boston meeting of the National Civil Service Reform League.....(ed) 1245
Promotion of efficiency in civil service in Chicago.....(n) 90

CIVIL SERVICE EXAMINATIONS:
Applicants for engineering positions on the Federal Railway Valuation Board .....(ed) 422
Engineering positions under Railway Valuation Board not yet filled..(n) 635
Examination questions for New York State Engineering positions..*1129, (ed) 1141
Examinations for positions in State Department of Highways and State Architect's office; Albany, N. Y., July 26.....(n) 132
Interstate railway valuation board of engineers; Results of examinations. .....(ns) 635, 646, 990, 1160, 1208, 1332
Clay, Experimental work in the investigation of a method of removing colloidal clay from the water-supply of the city of Buenos Aires, Argentina 15

CLEVELAND, OHIO:
Arbitration of differences between city and Cleveland Ry. Co. completed and report presented.....(n) 262
Free public service by engineers. By Marshall Morris..(ed) 878, (let) 1198
Cleveland Engineering Society, Report on water filtration at Cleveland, Ohio .....(ed) 81

PAGE

COAL:
Anthracite coal shipments for first seven months of 1913.....(n) 445
Exhaustion of anthracite coal deposits in Pennsylvania will be reached in 81 years .....(n) 919
Indianapolis Light & Heat Co.; 30,000-ton submerged coal-storage pit..*527
Production in West Virginia in 1912, (n) 323

COAL AND ORE HANDLING:
Coal classification yards of the Philadelphia & Reading Ry. at St. Clair, Penn. By Joseph S. Ward..*540
Hammersmith (London) Borough Council to invite bids on pumping a mixture of coal and water for new electric power station..(n) 303
Indianapolis Light & Heat Co.; 30,000-ton submerged coal-storage pit...*527
Unloading broken stone or gravel from cars by scraper. By Ralph Bennett *1030

COAST EROSION:
Atlantic City, N. J., Channel and beach-maintenance problem; Absecon Inlet on the north shore of Atlantic City, N. J.; Method of maintaining channel without injury to the beach by dredging only. By R. R. Raymond....150, (let) 523
Problem in beach reclamation and a prize for its solution.....*304
Silting of harbors and effect of piers and jetties upon the movements of sand .....(n) 644

COFFER-DAMS:
Accident to the foundations of the Pearl Harbor dry dock.....(n) 276
Ohio River Dam No. 48, Failure of the main coffer-dam. By J. C. Oakes..*231
Semicircular coffer-dam; Closing the entrance of a dry dock under construction; Marseilles, France....*856

COLUMBUS, OHIO:
Flood-prevention investigations making good progress.....(n) 234
Flood protection; Recommendations of the consulting hydraulic engineers.*631

COLUMNS:
Combination concrete and cast iron for columns and arch ribs.....*864
Concrete, Economical concrete columns and girder designed after Joint Committee's prescriptions..(lets), *886, 1042, 1251
Diagram for projecting edges of steel bearing-plates *1033
Office building of the Consolidated Gas Co., New York City; Details of unusual features; construction method, etc.....*1275
Shifting the girders and columns of the Chicago Elevated Railway.....*906

COMBUSTION:
Causes of dust explosions, Buffalo grain elevator dust explosion..(ed) 223
Development of improved gas-heating appliances; Inventions of C. E. Lucke, Professor of Mechanical Engineering, Columbia University, New York City.....*1186
Oxygen for enriching the air supplied to iron blast furnaces to be tried by the Ougree-Marihave Co., of Belgium .....(n) 560

COMMERCE:
Figures of amount of business of the port of New York and other cities, for fiscal year ended June 30, 1913 .....(n) 234
Increase in the foreign trade of the United States .....(n) 297

COMPRESSED AIR:
Concreting a tunnel by compressed air; Kansas City Terminal Ry., Kansas City, Mo. By A. C. Everham....*208
Foreign requirements governing work under compressed air. By Paul Seurot .....(let) 566
New York law governing work under compressed air ...(lets) 307, 425, 566
Raising a wrecked Atlantic liner by compressed air..... 419
Repairing a damaged steamship while floated by compressed air; Transatlantic steamer "Uranium"..(n) 615

COMPUTING DEVICES:
Locking devices for calculating and adding machines .....(n) 614
(See also Slide-rules.)

CONCRETE:
Action of alkali and sea water on concrete; U. S. Bureau of Standards report 50
Action of various substances on cement mortars. By Richard K. Meade... 21

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

CONCRETE: (Continued)
Aggregates:
Concreting train using a drag-line excavator.....1031, (let) 1198
Methods of specifying proportions of mix for concrete definitely..(n), 722, (let) 1144
Papers on tests of aggregates; Annual meeting of the American Society for Testing Materials..... 74
Proportioning natural aggregate for concrete.....(n) 722, (let) 1144
Unloading broken stone or gravel from cars by scraper. By Ralph Bennett *1030
Artificial marble made with white portland cement.....(n) 1260
Asphaltic. (See Pavements.)
Beams. Economical concrete columns and girder designed after Joint Committee's prescriptions...(lets) *886, 1042, 1251
Cinder:
Cinder-concrete wall lining used in exterior walls of Deutsches Museum at Munich .....(n) 613
Fire, load and water test upon cinder-concrete, terra-cotta and gypsum floor arches. By Harold Perrine *374
Investigation of the strength of cinder concrete.....*722
Columns. Economical concrete columns and girder designed after Joint Committee's prescriptions...(lets) *886, 1042, 1251
Cutting a concrete wall to provide expansion joints.....(n) 1034
Decorative concrete objects made by a waterworks employee for amusement .....(n) *173
Effect of stable refuse on concrete. By Benjamin Brooks.....(let) *317
Expansion joints:
Cutting a concrete wall to provide expansion joints.....(n) 1034
Cutting an expansion joint in a concrete wall.....(n) 1308
Experiments on the water-tightness of plain, untreated concrete at University of Wisconsin.....(n) 1177
Face finish.
Cut surface-finish for concrete.....*358
Retempered mortar as a finishing coat for concrete surfaces. By Albert A. Northrop...(let) 178, (n) 274
Grouting process for preventing slides on the Panama Canal. By A. S. Zinn *406
Hardening material; 95% iron dust or iron flour mixed with cement for finishing the surface of concrete floors.....(n) 981
Internal temperature range in concrete arch rings.....(n) 174
Oil-mixed. French tests on oil-mixed concrete; Effect of mixing a heavy mineral oil with concrete; Ponts et Chausees Laboratory at Boulogne-sur-Mer 1228
Pavements. (See Pavements.)
Paying for concrete according to its strength: Recent failure of a reinforced-concrete structure at Cedar Rapids, Iowa.....(let) 1314
Planer shavings and cement used as a plug in tremies for depositing concrete under water.....(n) 1027
Pressure. Test of pressure on wet concrete. By E. B. Germain.....*294
Proportioning natural aggregate for concrete .....(n) 722, (let) 1144
Reinforced concrete:
Arch viaduct: details of 286-ft. arch of Halen bridge, Bern, Switzerland.*531
Chimneys. (See Chimneys, concrete.)
Construction:
Boatways. Rockhaven Harbor, N. D., for Missouri River fleet of United States Engineer Corps. By S. R. Morrow.....*645
Bureau of Engraving and Printing, Washington, D. C.; a modern high-class factory building, 505 by 300 ft. By Fred W. Lepper *335
Carondelet Park bridge; Flat circular reinforced-concrete arch supported by cellular abutments with spread footings; Approach retaining walls; Railways; Monumental pylons, Cornices and railings embellishing the structure. By Charles W. Martin *646
Colorado Street reinforced-concrete arch bridge over the Arroyo Seco, Pasadena, Calif.....*146
Failure of part of Stark-Lyman Building, Cedar Rapids, Iowa. By Robert C. Barnett....*1104, 1254, (let) 1314
High-pressure Y-pipe connection, 96x72x72-in.: Puntledge River power development, Vancouver, B. C. By F. M. Kirsch...*793, (ed) 829, (let) 1094

PAGE

CONCRETE: Reinforced Concrete: Construction: (Continued)
Longest concrete arch; Langwies, Switzerland.....(ed) 269, (n) 277
Special concrete foundations in the Manila Port District. By John W. Graham.....*554
Water tank of unusual design built at plant of the Burson Knitting Co., Rockford, Ill.....*158
Water tank with a sliding joint..*1204
Wharf with grouted foundations; Harbor improvement at Iloilo, Philippine Islands. By Wilson T. Howe.....*1003
Design:
Bridge abutments with cantilever wings *817
Construction and use of empiric formulas. By Cyrus T. Brady, Jr. *163
Design of concrete abutments without wing walls for deck girders. By C. M. Luther.....*816
Design of standard reinforced-concrete retaining walls. By H. M. Gibb.....*170, (n) 274
Economical concrete and girder designed after Joint Committee's prescriptions.....(lets) *886, 1042, (n) 1251
Graphical method of dividing neutral axis in concrete arch design. By T. A. Smith...*611, (n) 822
Models in engineering design. By William M. Torrance....(let) *1249
Electrolysis. (See Concrete, Electrolysis.)
Expansive power of water-soaked wood on concrete beams.....(n) *615
Failures. (See Building accidents.)
Reinforcement:
Combination concrete and cast iron for columns and arch ribs..*864
Re-rolled from old rails for concrete reinforcement.....(ed) 81
Re-rolled rails; Paper at annual meeting of the American Society for Testing Materials.....75, (erratum) 181
Electrolysis. (See Concrete, Electrolysis.)
Report of committee; American Society for Testing Materials..... 40
Retempered mortar as a bond between new and old concrete. By Albert A. Northrop.....(let) 178, (n) 274
Seawater:
Action of alkali and sea water on concrete; U. S. Bureau of Standards report..... 50
Four-year test of the effect of sea water on concrete.....1023
Tile protection for intertidal concrete in sea walls.....*1178
Should concrete be mixed longer than is now common.....(ed) 1139
Strength deficiency of overwet and of undermixed concrete. By Ernest McCullough.....(let) 1250
Tests:
Action of alkali and sea water on concrete; U. S. Bureau of Standards report..... 50
Experiments on the water-tightness of plain, untreated concrete at University of Wisconsin.....(n) 1177
Fire, load and water test upon cinder-concrete, terra-cotta and gypsum floor arches. By Harold Perrine *374
Four-year test of the effect of sea water on concrete.....1023
French tests on oil-mixed concrete; Effect of mixing a heavy mineral oil with concrete; Ponts et Chausees Laboratory at Boulogne-sur-Mer 1228
Internal temperature range in concrete arch rings.....(n) 174
Investigation of the strength of cinder concrete.....*722
Molds for field samples of concrete .....(n) *822
Papers on tests of aggregates; Annual meeting of the American Society for Testing Materials..... 74
Pressure tests of jointed concrete pipes. By Mason D. Pratt..*1126, (let) 1320
Strength deficiency of overwet and of undermixed concrete. By Ernest McCullough .....(let) 1250
Stresses in a reinforced-concrete floor slab under heavy load; new freight terminal of the Minneapolis, St. Paul and Sault Ste. Marie Ry. in Chicago .....(n) 869
Tests of pressure on wet concrete. By E. B. Germain.....*294
Wall made of cement grout; Middleburg, Va.....(n) 1036
Waterproofing:
Experiments on the water-tightness of plain, untreated concrete at University of Wisconsin.....(n) 1177

PAGE

CONCRETE: Waterproofing: (Cont.)
French tests on oil-mixed concrete; effect of mixing a heavy mineral oil with concrete; Ponts et Chausees Laboratory at Boulogne-sur-Mer 1228
Why not use more cement in concrete? .....(ed) 879, (lets) 1043
Concrete buckets; Improvised bottom dump concrete bucket.....(n) *1036

CONCRETE CONSTRUCTION:
Arch viaduct; details of 286-ft. arch of Halen bridge, Bern, Switzerland *531
Bank vault of the Guaranty Trust Co. of New York City.....*262
Boatways of reinforced-concrete Rockhaven Harbor, N. D.; for Missouri River fleet of United States Engineer Corps. By S. R. Morrow...*645
Bridge abutments with cantilever wings *817
Building concrete bridges in rural Kansas .....(n) 974
Bureau of Engraving and Printing, Washington, D. C.; a modern high-class factory building, 505 ft. by 300 ft. By Fred W. Lepper.*335
Collapse of a reinforced-concrete frame in a building, Vancouver, B. C. By A. P. Huechel.....*290
Concrete water barrels for railway bridges .....(n) 364
Concreting a tunnel by compressed air; Kansas City Terminal Ry., Kansas City, Mo. By A. C. Everham....*208
Covering of Jones' Falls; an open creek, taking the drainage of the city's streets and houses, and long notorious as a public nuisance; used as a low-grade street connecting railway stations..*2, *927
Design of concrete abutments without wind walls for deck girders. By C. M. Luther.....*816
Freight terminal for the "Soo Line", Chicago, Ill. *378
Grouting process for preventing slide on the Panama Canal. By A. S. Zinn *406
New York State barge canal crossing of Oak Orchard Creek, Medina, N. Y. By Noble E. Whitford.....*192
Notes on the construction of the St. Louis filters. By Edward E. Wall *1329
Ohio River locks at Louisville, Ky.; Navigation lock independent of the dam, located in a canal which affords passage around "the falls"; Proposed reconstruction of the river dam; Construction plant and methods employed.....*1238
Paying for concrete according to its strength: Recent failure of a reinforced-concrete structure at Cedar Rapids, Iowa. By Robert C. Barnett .....(let) 1314
Planer shavings and cement used as a plug in tremies for depositing concrete under water.....(n) 1027
Rapid construction of Medina Valley irrigation project in Texas; Construction of main dam; Contractor's plant and construction methods. By Terrell Bartlett, *508, (erratum) 626
Remarkable speed in masonry construction on foundations of Kensico Dam .....(n) 268
Replacing old wooden sills of chanoine wicket dams with concrete sills, (let) *181
Retempered mortar as a finishing coat for concrete surfaces. By Albert A. Northrop.....(let) 178, (n) 274
Rock grouting and caisson sinking for the Hales Bar dam, Tennessee River, Hales Bar, Tenn. By A. H. Horton. *949, (ed) 1038, (let) 1143
St. Lawrence River at Levis, Quebec; Dry-dock of record size, built by the Department of Public Works of the Dominion of Canada.....*1214
Simple concrete forms for inside of reservoir wall, Pleasantville, N. Y. .....(n) *1309
Sliding ground in Culebra cut, Panama Canal. By Donald F. MacDonald. 408
Walls made of cement grout; Middleburg, Va.....(n) 1036
Welland ship canal; Its relation to the present and to the old canals and details of design and construction *598
(See also under Concrete, Reinforced Concrete, Construction.)

CONCRETE FORMS:
Bureau of Engraving and Printing, Washington, D. C. By Fred W. Lepper *335
Mold for field samples of concrete. (n) *822
Simple concrete forms for inside of reservoir wall, Pleasantville, N. Y. .....(n) *1309

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

CONCRETE MIXING AND HANDLING: PAGE
Bureau of Engraving and Printing, Washington, D. C. By Fred. W. Lepper *335
Cableway for unloading cars....1031, (let) 1198
Concreting a tunnel by compressed air; Kansas City Terminal Ry., Kansas City, Mo. By A. C. Everham *208
Concreting train using a drag-line excavator.....1031, (let) 1198
Gravity concrete-depositing plant, Fallsway Viaduct, Baltimore, Md *927
Improvised bottom dump concrete bucket .....(n) *1036
Methods of specifying proportions of mix for concrete definitely....(n), 722, (let) 1144
Proportioning natural aggregate for concrete.....(n) 722, (let) 1144
Should concrete be mixed longer than is now common?.....(ed) 1138
Strength deficiency of overwet and of undermixed concrete. By Ernest McCullough .....(let) 1250
Track elevation and portable concreting plant; Chicago, Milwaukee & St. Paul Ry.....*26, (n) 365
Water-heating attachment for concrete mixers .....(n) *1308
Condensers. Rotary air pump for high-vacuum condenser service.....*507

CONDUITS:
Baltimore, Md., Covering of Jones' Falls; an open creek, taking the drainage of the city's streets and houses, and long notorious as a public nuisance. Used as a low-grade street connecting railway stations *2 *927
Creeping of cables in.....(n) 73
Instructions to field parties for the sub-surface survey of Cincinnati, Ohio *1080
Large reinforced-concrete culverts, Newcastle, Eng.....*339
Suggested simplification for the value of C in Kutter's formula and a sewer discharge diagram. By Alfred Boyd.....(let) *316

CONSERVATION OF NATURAL RESOURCES:
Comments by Secretary Lane on conservation; Annual report of the Secretary of the Interior....(ed) 1312
Diminishing timber supply and municipal forests .....(ed) 469
Encouragement of forestation by the Canadian Pacific Ry.....(n) 155
Exhaustion of anthracite coal deposits in Pennsylvania will be reached in 81 years.....(n) 919
Federal power over public lands held supreme over state jurisdiction. (n) 1260
Good work by state conservation commissions .....(ed) 81
Hetch Hetchy National Park, San Francisco wins its long fight.(ed) 1212
National Conservation Congress, Washington, D. C. By Clarence T. Johnson..(ed) 1092, 1106, (let) 1199
National or state control of the gifts of nature; National Conservation Congress. By Clarence T. Johnson..(ed) 1092, 1106, (lets), 1199. 1316
Neglected source of power in nature, 250, (ed) 270, (let) 425
Seattle, Wash., Proposed reforestation of the Cedar River watershed....*480
Utilizing low-grade temperature drops as a source of power.....(ed) 270

CONTRACTS AND CONTRACTORS:
Bonus system for the purchase of portland cement.....281, (ed) 312
Camps, Camp Hill View sanitation, Catskill Aqueduct; General description; Sanitary clauses of the contract; Carrying out of the sanitary measures. By Arthur W. Tidd *752
Chicago garbage-disposal situation at expiration of contract with Chicago Reduction Co.....(ns) 733, 799
Collection and use of construction cost data 1305
Contract for the largest electric hoist in America.....(n) 1257
Contract on a cost-plus-a-percentage basis pending between the Interborough Co. of New York City and John F. Stevens.....(n) 249
Contracting firm of John Aird & Co., London, to be dissolved.....(n) 751
Chicago, Ill., Four garbage-disposal contracts .....(ed) 718
Contracts for the construction of six destroyers awarded.....(n) 635
Eight-hour day for workmen employed by contractors.....(n) 103
Employment and investment combined: a warning.....(ed) 985, (let) 1143

CONTRACTS AND CONTRACTORS: (Continued) PAGE
Expediting progress on "rush" construction work. By James L. Stuart 818
Field for the inspector's efforts. By Arthur W. Tidd.....1030
Fixing a basis in advance for comparison of alternate bids.....(ed) 221
Garbage-disposal contract made by City of Los Angeles, Calif., to last ten years.....(n) 1107
Good roads extravagance and good sense in West Virginia.....(ed) 367
Granting of licenses to builders by the Board of Examiners in the Building Department of Boston, Mass., (n) 1259
High percentage of profit on a New York State road contract.....(n) 779
High price of capital; Money for productive enterprises hard to get, (ed) 618
Illinois law for licensing mason contractors 813
Investigation of New York State highway work.....(ed) 1142
Long-term guarantees on State highway contracts in New York. By F. R. Upton....(ed) 1196, (let) 1316
Los Angeles, Calif., Four garbage-disposal contracts.....(ed) 718
Municipal contracts with public utility companies in Pennsylvania; Full control of rates by the Public Service Commission .....(n) 981
New York City's new garbage disposal contract; Contractor agrees to pay the city for garbage delivered to certain points of deposit on the waterfront.....267, (ed) 269
New York City, Four garbage-disposal contracts .....(ed) 718
New York law governing work under compressed air..(lets) 307, 425, (n) 566
Philadelphia, Penn., Four garbage-disposal contracts.....(ed) 718
Preparation of engineering reports. By Edward Beattie Stephenson...1218
Quantity surveying in the United States. By Leslie H. Allen..(ed) 877, (let) 988
Rates paid in Boston for hired machinery in construction of sewers, (n) 615
Remarkable professional fee of a consulting engineer.....(ed) 519
Rules for laying up idle equipment.. 820
Roads, Instructions for foremen and contractors on state road construction in Wisconsin..... 291
Safety rules for handling construction materials .....(n) 365
Short-term garbage-reduction contracts and municipal ownership....(ed) 31
Should an engineer make himself financially responsible for his estimates? .....(lets) 85, 178
Should fees be charged for the use of plans by contractors estimating on work?.....(ed) 831
Some general principles applicable to public construction contracts.....1017
Street lighting contracts of Philadelphia for coming year.....(n) 472
Why "safety first" is sound economy. By Alexander Haring.....1295

CONVEYORS:
Belt conveyor used for back-filling a sewer .....(n) 196
Handling cellar excavation with a conveyor.....(n) *823
Largest conveyor belts in the world built for coaling plant at Fort-Kembla, N. S. W.....(n) 828

COPPER:
Influence of copper in retarding the corrosion of steel plate..... 232
Report of committee; Annual meeting of the American Society for Testing Materials..... 37

COST DATA:
Arrowrock Dam, Idaho. Cost records of foundation excavation. By Charles H. Paul..... *93
Australian water meter for irrigation supplies; devised by J. S. Dethridge, of Melbourne.....*1283
Automatic blueprint finisher.....(n) 364
Basalt facing for concrete wall, Hamburg Harbor..... 929
Big Bear Valley dam; a concrete dam of the multiple arch type. By John S. Eastwood.....*1284
Bringing an old water-works valuation up to date. By William E. Butt. 408
Broadway bridge over Willamette River, Portland, Ore., with Rall bascule span. By W. P. Hardesty.*704
Charges for public water service to private fire protection systems. By W. E. Miller.....1168
Collection and use of construction cost data 1305

COST DATA: (Continued) PAGE
Columbus, Ohio, flood-protection; recommendations of the consulting hydraulic engineers.....*631
Concrete water barrels for railway bridges.....(n) 364
Cost data on blue-printing. By Frank H. Jones.....612, (n) 823
Cost of a cable-lift drawbridge.....(n) 973
Cost of government; Age of extravagance; national debt.....(n) 1175
Cost of municipal electric lighting at Chicago 668
Cost of operation of 5-ton motor trucks, (n) 338
Cut surface-finish for concrete.....*358
Drawbridge operation, Halsted St. drawbridge, Chicago, Ill. By E. E. Howard.....(let) 371
Economies on small rock-drilling jobs 1305
Effect of heavy motor traffic on cost of road maintenance..... 630
Electric power, Papers at the annual convention of the American Institute of Electrical Engineers.... 80
Engineering, administration and incidental expenses of contract sewer expenses at Louisville, Ky....(n) 615
Excavating with large scrapers; University of Illinois; Maney scraper. By A. B. McDaniel....*1302
Garbage and refuse collection in different cities..... 578
Garbage disposal, New York City, Garbage disposal contract; Contractor agrees to pay the city for garbage delivered to certain points of deposit on the waterfront..267, (ed) 269
Garbage reduction; Operations of the garbage-reduction plant, Columbus, Ohio, 1912..... 562
German "ladder" staging.....*606
Hydraulic dredging on the upper Mississippi River; Methods and costs. By R. Monroe.....*143
Irrigation, Cost of irrigation works per acre supplied with water, (let) 128, 348, (let) 354, (ed) 987
Lining an irrigation ditch with Hess metallic fluming. By Elbert M. Chandler *464
Los Angeles Aqueduct....(lets) 318, 1095
Maintenance and repairs to the So. Halsted St. lift bridge over the Chicago River. By E. E. Howard, (let) 371
Motor-omnibus operation; Motor omnibus as a competitor of the electric street railway; report by Harry P. Nichols, Chief of the Bureau of Franchises, and John A. McCollum. By Pendleton Dudley..(ed) 1039, 1050, 1087, (let) 1321
New York State Barge Canal. By Emile Low..... 561
North Poudre Irrigation Co. tunnel completed Nov. 13.....(n) 1159
Notes on the construction of the St. Louis filters. By Edward E. Wall.*1329
Plain concrete pavements in Kansas City, Mo.; Construction of pavements and comments upon their wear and utility. By Clark R. Mandigo.....*112, (ed) 125
Problem in beach reclamation and a prize for its solution.....*304
Proposed reforestation of the Cedar River watershed, Seattle, Wash..*480
Proposed Shoal Lake or Greater Winnipeg aqueduct.....628, (n) 635
Railways, Concerning the railways of sixty years ago.....(ed) 314
Reinforced-concrete wharf with grouted foundations; Harbor improvement at Iloilo, Philippine Island. By Wilson T. Howe.....*1003
Repair and maintenance of various kinds of pavement.....1137
Sprinkling and oiling streets, St. Paul, Minn.; Organization, methods, cost and method of assessing cost.... 295
Stable manure collection and disposal at Columbus, O., in 1912....(n) 525
Torrance-Cunningham wharf-bulkhead, Savannah, Ga. By Wm. M. Torrance *710
Transportation three years' record in motor-omnibus development.....1180
Treatment of worn out and raveled macadam road surfaces. Paper before American Road Congress. By E. A. Stevens..... 528
Types of New York State roads; Classes of pavements adapted to different kinds of traffic requirements; Cost data; Conclusions based on several years' experience. By W. G. Harger.....*1148
Unloading earth from cars by sluicing. By J. C. Lathrop..... 609
Valuation of buildings. By Robert H. Overstreet 516
Walls made of cement grout; Middleburg, Va.....(n) 1036

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

COST DATA: (Continued)
Water main with unusual features; 48-in. cast-iron water main across a salt marsh to Atlantic City, N. J. By T. Chalkley Hatton *1046
Water-works charges for private fire protection; a valuable study of the principles and practice; by Leonard Metcalf, consulting engineer, Boston, Mass. 1236
Weight and cost of London motor omnibuses. By Pendleton Dudley, (let) 1321

COST KEEPING:
Daily reports on pipe-laying; Bureau of Distribution, Department of Water, San Diego, Calif. ....(n) *1310
Sprinkling and oiling streets, St. Paul, Minn.; Organization, methods, cost and method of assessing cost.... 295
Couplers. (See Car Couplers.)

CRANES:
Building with traveling tower-cranes, *814, (n) 1310
Combined jib crane and traveling conveyor for Hamburg (Germany) quay wall. By I. F. Bubendey... *189
Floating cranes for the permanent equipment of the Panama Canal.. *118
Loading formulas for crane-girders, (ns) 815, 1036
Locomotive crane with an electro-magnet lift.....(n) 1185
Reinforced-concrete pontoon crane, 100-x43 ft., constructed at Marseilles .....(n) 477
Renewing switches with wrecking cranes on the Philadelphia & Reading Ry.....(n) 981
Crematories, Oil-burning crematory to be built by United States Government at Ancon, C. Z.....(n) 630
Creosote. (See Timber preservation.)
Cribs, Timber buffers for protecting vessels entering the Panama Canal locks *306
Crossovers. (See Track.)

CULVERTS:
Bridges and culverts for country roads; Paper before American Road Congress. By A. R. Hirst.. 729
Delaware, Lackawanna & Western R. R., Summit cutoff, west of Scranton, Penn.; Some of the heaviest railroading ever undertaken in the East; Details of the new line and its structures; Construction methods *410
Large reinforced-concrete culvert, Newcastle, Eng.....*339
New York State barge canal crossing of Oak Orchard Creek, Medina, N. Y. By Noble E. Whitford.....*192
Curbs; Railroading with subsurface curb for shoulders of road embankments. By Roland Watts.....*1304
Current meters, Method of current-meter rating, California Development Co. By J. B. Brown.....*712

CURVES:
Application of the flow-summation curve to problems of steam regulation and storage. By E. Clinton Jansen *1290
Determining power possibilities on a watershed; Methods of constructing curves requisite to the power determinations. By Lyle A. Whitsit *496
Easement curves for street-railway track .....(n) 1035
Intersecting circular curves with non-parallel tangents: a theorem. By W. R. Horn.....*820
Railway curve formulas; Formula for swing of locomotive truck. By Kenneth McIntosh.....(let) 673
Railway location. (See Railway location.)

D

DAMS:
Arrowrock, Excavation for; Drag-line excavator, orange-peel buckets, skips from cableways, hydraulic jets, blasting used in loosening rock. By Charles H. Paul..... *93
Austin, Penn.:
End of criminal prosecutions which followed the failure.....(n) 1260
Indictment against George C. Bayliss, following Austin dam failure, dismissed Nov. 25.....(n) 1208
Concrete:
Big Bear Valley dam; a concrete dam of the multiple arch type. By John S. Eastwood.....*1284
Hales Bar: Rock grouting and caisson sinking; Tennessee River, Hales Bar, Tenn. By A. H. Horton *949.....(ed) 1038, (let) 1143
Kensico, N. Y., Remarkable speed in construction of foundations of Kensico Dam.....(n) 268

PAGE

DAMS: CONCRETE: (Continued)
Keokuk, Iowa, Mississippi lock; To enable river traffic to pass the dam; Single lift of 30 to 40 ft., and gate equipment.....*964
Rapid construction of Medina Valley irrigation project in Texas; Construction of main dam; Contractor's plant and construction methods. By Terrell Bartlett *508, (erratum) 626
Reconstructing the foundation of the Elwha River dam; Olympic Power Co., Port Angeles, Wash..*1258
Spaulding dam and South Yuba power development of the Pacific Gas & Electric Co. By H. C. Vensano *1163
Waldeck storage dam, on the River Eder, Germany. By Robert Grimshaw *852
Design, Neglected first principles of masonry dam design..(lets) *442, 623, 832
Diversion dam with unusually high steel flashboards. By M. C. Hinderlider *910
Earth, Notes on the construction of a large earth dam; Somerset, Vt...*1300
Elwha River, Reconstructing the foundation; Olympic Power Co., Port Angeles, Wash.....*1258
Experiments on uplift pressure in masonry dams.....*202, (let) 371
Gatun dam, Panama canal. (See Canals, Panama.)
Germany, Weldeck storage dam, on the River Eder. By Robert Grimshaw.*852
Hales Bar:
Inauguration of dam, Nov. 13..(n) 1055
Rock grouting and caisson sinking; Tennessee River, Hales Bar, Tenn. By A. H. Horton....*949, (ed), 1038, (let) 1143
Hollow. See above under Concrete.)
Horse Shoe Bend dam, Bassano, Alta., had its gates closed Oct. 20..(n) 892
Kensico, N. Y., Remarkable speed in masonry construction on foundations of Kensico Dam.....(n) 268
Keokuk, Iowa, Mississippi lock; to enable river traffic to pass the dam; Single lift of 30 to 40 ft., and gate equipment *964
Masonry:
Experiments on uplift pressure in masonry dams.....*202, (let) 371
Mexican Northern Power Co., Chihuahua, Mex.: Use of hydraulic lime for a masonry dam. By Guy S. Newkirk..... 19
Mohne dam, Ruhr District, Germany.*751
Neglected first principles of masonry dam design.....*442, (lets) 623, 832
Medina Valley, Texas, Concrete dam 164 ft. high; contractor's plant and construction methods. By Terrell Bartlett..*508, (erratum) 626
Mexican Northern Power Co., Chihuahua, Mex.: Use of hydraulic lime for a masonry dam. By Guy S. Newkirk 19
Movable:
Operations of the Mohawk River bridge dams. By D. A. Watt, *282, (erratum) 472
Replacing old wooden sills of chanoine wicket dams with concrete sills.....(let) *181
Neye dam, Germany, Experiments on uplift pressure in masonry dams, *202, (let) 371
Oester dam, Germany, Experiments on uplift pressure in masonry dams, *202, (let) 371
Ohio River No. 48, Failure of the main coffer-dam. By J. C. Oakes.....*231
Puntledge hydroelectric project; Vancouver, B. C.; Novel features in flume and penstock design. By F. M. Kirsch....*793, (ed) 829, (let) 1094
Seine River, France, Replacing old wooden sills of chanoine wicket dams with concrete sills By D. W.....(let) *181
Somerset, Vt., Notes on the construction of a large earth dam.....*1300
South San Joaquin irrigation project, California *748
Spaulding dam and South Yuba power development of the Pacific Gas & Electric Co. By H. C. Vensano..*1163
Uplift pressure in. By Edward Godfrey.....(let) 371
Danforth, Frederic, Biography of..... *89
Daniels, Fred Harris, Biographical sketch of *874
Dayton, Ohio, Preliminary report on flood protection....775, (lets) 880, (n) 989
Dentists, Civil engineer or dentist?..(ed) 367
Denver, Colo., City of Denver and Denver Union Water Co. decision....(ed) 177

DEPRECIATION:
What is a proper allowance for depreciation in a sewerage system? (ed) 1093
(See also Public service corporations.)

PAGE

DERRICKS:
Breaking quarry stone with a cannon ball .....(n) *822
Building derrick with 100-ft. boom....*166
Derrick cars for bridge erection..... 169
Derrick rigging involving a single connection of the bucket line to the boom *612
Erection of a cable lift bridge. By W. J. Howard.....*500
Rigging a derrick-boom end in three ways.....(n) *1035
Steel guyed derricks for building erection *1028
Wooden derrick boom broke, Broadway and 37th St., New York City, Nov. 29.....(n) 1208
Detroit, Mich., Annual capacity and the capitalization of automobile manufactories .....(n) 869
Diesel engines. (See Gas and oil engines.)

DOMES:
Cast-steel dome for the drainage shaft of the Hudson River siphon; Description of and method of manufacture and transportation.....*896
Wisconsin capitol; Steel tower which forms the support or substructure of the dome, rising from the foundations and carrying the dome independently of the main portion of the building.....*389
Doors; Automatic revolving door, collapsible in case of panic.....(n) 555
Drag line excavators, Concreting train using a drag-line excavator..1031, (let) 1198

DRAINAGE:
Florida Everglades; Report on, by a board of engineers composed of Prof. Daniel W. Mead, of Chicago, and the University of Wisconsin; Allen Hazen, of New York, and Leonard Metcalf, of Boston, Mass. 835
Louisiana, Drainage of lands of the lower Mississippi basin which are naturally available for agriculture. By A. M. Shaw.....*300

DRAWING AND DRAWINGS:
Automatic blueprint finisher.....(n) 364
Cost data on blueprinting. By Frank H. Jones.....612, (n) 823
Graphical method for dividing the neutral axis of an arch....(n) *1310
Hook for drawings in vertical filing cases .....(n) *614
Models in engineering design. By William M. Torrance.....(let) *1249
Optimistic view of the draftsman's job (including poem). By E. A. Van Deusen .....(let) 85
Rules governing the submission of sewerage and water-supply plans to the New Jersey State Board of Health..... 548
Weighing the plot as a means of measuring land areas.....(n) 172
Drawing instrument: Fountain drawing pen of commercial value perfected .....(n) 614, 823

DREDGES AND DREDGING:
Channel and beach maintenance problem; Absecon Inlet on the north shore of Atlantic City, N. J.; Method of maintaining channel without injury to the beach by dredging only.....*150, (let) 523
Dipper dredge with hydraulic jets for leveling the spoil banks. By Chester B. Loomis..196, (erratum) 472
Drainage of lands of the lower Mississippi basin; in Louisiana, which are naturally available for agriculture. By A. M. Shaw.....*300
Electric hydraulic dredge; East Side Levee and Drainage District; Levee system, East St. Louis, Ill.....*432
Extensive dredging operations to keep approach channels to proper depth at Liverpool, England.....(n) 668
Hydraulic dredging on the upper Mississippi River; Methods and costs. By R. Monroe.....*143
Large clam-shell dredges; Levee building methods and standards in California. By Fred H. Tibbetts.*456
Panama Canal 15-cu-yd. dipper dredges, (n) 1036
Relay pumping station installed on west side of Culebra Cut, Panama Canal, for excavation at Cucaracha slide.....(n) 386
Repairs to the Imperial Valley irrigation system.....(n) 1021
Work of the seagoing suction dredges on the Panama Canal.....(n) 117

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

DRILLS AND DRILLING:
Cutting an expansion joint in a concrete wall.....(n) 1308
Economies on small rock-drilling jobs. 1305
Evolution of the gasoline rock drill, (ed) 933, *913
Rice gasoline rock drill; a free piston gasoline rock drill. By M. D. Baldy .....*913, (ed) 933, (let) 1041

DRY-DOCKS:
Boston, Mass., Largest dry dock in the world proposed for Boston....(n) 434
Dimensions of Boston dry-dock....(n) 733
Keokuk, Iowa, Mississippi lock; To enable river traffic to pass the dam; single lift of 30 to 40 ft., and gate equipment.....*964
Large dry-dock opened at Singapore, Straits Settlements, Aug. 26. (n) 635
Liverpool, England, Plan and sections of the Gladstone dock, at present the largest dry dock in the world. *454
Marseilles, France, Semicircular coffer-dam, closing the entrance of a dry dock under construction.....*856
New York Harbor, New dry-dock contemplated .....(n) 946
Pearl Harbor, Honolulu, H. I., Accident to the foundations of the Pearl Harbor dry dock.....(n) 276
St. Lawrence River at Levis, Quebec; Dry-dock of record size built by the Department of Public Works of the Dominion of Canada...(n) 635, *1214

DUST:
Prevention on roads. (See Roads.)
Studies in air washing; Condensed from a paper read before the Sanitary Engineering section of the American Public Health Association at Colorado Springs, September, 1913..... 571
Dust explosions; Husted Milling & Elevating Co., Buffalo, N. Y., June 24.....(ns) 47, 574, *88, (ed) 223, 386, 1331
Dust prevention. Dust precipitation plant of the Riverside Portland Cement Co., Crestmore, Cal..... 716
Dynamometers. Fan wheels as dynamometers used successfully by Buffalo Forge Co.....(n) 265

DYNAMITE:
Dynamite for subsoiling agricultural lands.....(n) 1188
Rules for misfires in blasting....1227, (ed) 1245
Selection of explosives for engineering work; Comparative energies of commercial explosives..... 495

E

EARTH-HANDLING MACHINES:
Handling cellar excavation with a conveyor .....(n) *823
Rules for laying up idle equipment.... 820
Earth pressure against foundation walls; Failure of a 18-in. rubble wall at Manhattan, Kan. By R. A. Seaton .....(let) *721

EARTHSLIDES:
Grouting process for preventing slides on the Panama Canal. By. A. S. Zinn *406
Portobello quarry, Panama, Aug. 11, (n) 386
Railway embankment slid into lake near Piscotasing Station, on Canadian Pacific Ry., July 10. (n) 234
Sliding ground in Culebra cut, Panama Canal. By Donald F. MacDonald.. 408

EARTHWORK:
Arrowrock Dam, Idaho, Excavation for; Drag-line excavator, orange-peel buckets, skips from cableways, hydraulic jets, blasting used in loosening rock. By Charles H. Paul *93
Belt conveyor used for back-filling a sewer .....(n) 196
Building a levee across an old sawdust bed.....*169
Convenient earthwork table. By Philip B. Hill *825
Dipper dredge with hydraulic jets for leveling the spoil banks. By Chester B. Loomis.*196, (erratum) 472
Excavating a bridge abutment through quicksand. By Frank I. Barrett..*608
Excavating with large scrapers; University of Illinois; Maney scraper. By A. B. McDaniel.....*1302
Large clam-shell dredges; levee building methods and standards in California. Fred H. Tibbetts....*456
Levees; Sloughing off of the Mississippi levee at Helena, Ark..*1014, (ed) 1037
Notes on the construction of a large earth dam; Somerset, Vt.....*1300

EARTHWORK: (Continued)
Prismoidal formula applies to the volume of sphere.....(n) 1200
Quick lime for thawing frozen ground, (n) 364
Simple power scraper outfit used for earth stripping; Middlebury, Vt., (n) 1035
Summit cutoff of the Delaware, Lackawanna & Western R. R., west of Scranton, Penn.; Some of the heaviest railroading ever undertaken in the East; Details of the new line and its structures; Construction methods.....*410
Suspension dumping bridge for building railway embankments.....*1024
Task system of constructing roads, Philippine Islands.....(n) *365
Templates for embankment slopes. By M. D. Ewell.....*821
Unloading earth from cars by sluicing. By J. C. Lathrop..... 609
Economics: Can engineers be trusted to arbitrate fairly and intelligently between the public interests and the property interests?..... 120
Edison, Thomas A.; Passing of Edisonian research .....(ed) 717, 724

EDUCATION:
Concerning engineering research—the useless and the useful....(ed) 32, (let) 129
East Pittsburgh plant of the Westinghouse Electric & Mfg. Co.; Summer course for electrical engineering teachers.....(n) 233
Educational trips by engineers in a city department; Borough of Manhattan .....(n) 90
Engineering course for $20 in 1837... 562
Engineering English; Discussion of the teaching of English in engineering schools .....914, (let) 1041
Industrial and Technical Education Conference organized in Philadelphia .....(n) 892
Industrial:
Apprenticeship course in signal engineering established by Union Switch & Signal Co.....(n) 196
Papers at annual convention of the American Institute of Electrical Engineers 78
Vocation schools to be assisted by State of Pennsylvania.....(n) 595
Modern technics and culture; Paper at Leipzig meeting of American Society of Mechanical Engineers.... 123
Neglected opportunity of the engineering graduate.....1189, (ed) 1196
Paper on hydraulic engineering education; Annual meeting of the Society for the Promotion of Engineering Education..... 46
Some random suggestions to the engineering school graduates of 1913, (ed) 271
Teaching mathematics to engineering students; Suggestions as to the teaching of pure mathematics. By Willis Whited..... 538
Two weeks course in Highway Engineering for new county and town highway superintendents at the University of Illinois.....(ed) 1311

EFFICIENCY ENGINEERING:
Advertising an "institute of efficiency," (ed) 1037
Efficiency engineering achievements in the railway service.....(ed) 1245
Industrial management; Paper at Leipzig meeting of American Society of Mechanical Engineers... 123
Need of a new official in certain manufacturing plants. By H. C. Spaulding .....(let) 35
Promotion of efficiency in civil service in Chicago.....(n) 90
Seven principles for increasing the efficiency of municipal officials. By H. S. Gilbertson.....(let) 774
Electrical engineering. (See Engineering.)
Electric carrier railways. Experimental electric carrier railway plant at Paterson, N. J.; for rapid transfer of mail and express. System of American Pneumatic Service Co. and Cambridge demonstration plant *637, *702
Electric generators, 30,000-kw. steam turbine generating units; Interborough Rapid Transit Co. of New York City.....*428
Electric hoists. Contract for the largest electric hoist in America....(n) 1257
Electric railway accidents, Empire United Ry., Butting collision near Oswego, N. Y. Aug. 6.....*384

ELECTRIC LIGHTING:
Chicago, Ill., Cost of municipal electric lighting 668
Half-watt tungsten-filament electric lamp .....(ed) 717, 724

ELECTRIC LIGHTING: (Continued)
Lighting railway yards; Committee report, Association of Railway Electrical Engineers..... 888
Panama-Pacific International Exposition of 1915, at San Francisco, Calif.; Electric light and power; gas, steam and compressed air; sewers and sanitary equipment; high-pressure fire-protection; roads and pavements. By A. H. Markwart *1070
Rates, Municipal contracts with public utility companies in Pennsylvania; full control of rates by the Public Service Commission....(n) 981
Street lighting contracts of Philadelphia for coming year.....(n) 472
Washington, D. C., Studies in; Discussed by W. C. Allen, Electrical Engineer, District of Columbia, (n) 694
Electric locomotives. (See Locomotives.)
Electric machinery, Papers at the annual convention of the American Institute of Electrical Engineers..... 79

ELECTRIC MOTORS:
Electric-motor operated clam-shell bucket *168
Motor inspection and maintenance in industrial plants; Edison Electric Illuminating Co., Brooklyn, N. Y. By F. E. Hanchette.....*746
Papers at the annual convention of the American Institute of Electrical Engineers 79

ELECTRIC POWER:
Chicago, Ill., Parsons steam-turbine generating-unit; 33,500-hp. British built steam turbine of the Commonwealth Edison Co., Chicago, Ill. *940
Determining power possibilities on a watershed; Methods of constructing curves, requisite to the power determination. By Lyle A. Whitsit *496
Direct current at 2400 volts to be used on electric traction system of the Chicago, Milwaukee & St. Paul Ry. (n) 1331
Electric hydraulic dredge; East Side Levee and Drainage District; Levee system, East St. Louis, Ill.*432
Germany, State hydro-electric power system to be built in Prussia..(n) 483
Kansas City, Clay County & St. Joseph Ry.; Problems of design and the more important details of construction. Mr. Robert P. Woods..*688
Keokuk, Iowa:
Mississippi lock; to enable river traffic to pass the dam; Single lift of 30 to 40 ft., and gate equipment *964
Mississippi River power plant dedicated Aug. 26.....(n) 435
Turbines of the Mississippi River Power Co.....*340
Turbine runners of the Mississippi River Power Co. By H. B. McDermid *342
Motor inspection and maintenance in industrial plants; Edison Electric Illuminating Co., Brooklyn, N. Y. By F. E. Hanchette.....*746
New York City street railways; Three 30,000-kw. steam-turbine generating units built for Interborough Rapid Transit Co.....(n) 324, *428
Northwestern Electric Co., White Salmon River power development; Probably the largest wood-stave pipe yet built.....*685
Operating-control system of the Panama canal locks.....*1323
Panama-Pacific International Exposition of 1915, at San Francisco, Calif.; Electric light and power; gas, steam and compressed air; sewers and sanitary equipment; high-pressure fire-protection; roads and pavements. By A. H. Markwart *1070
Papers at the annual convention of the American Institute of Electrical Engineers 80
Permit for power development on the Pend d'Oreille River, Wash., granted International Power & Mfg. Co.....(n) 324
Power development in U. S. forest reserves being greatly increased.(n) 324
Power plant designed as a house of cards; Pioneer Station of the Utah Light & Railway Co., Ogden, (ed) 985, (ns) 990, 1055
Puntledge River power development, Vancouver, B. C.; Novel features in flume and penstock design. By F. M. Kirsch.....*793, (ed) 829, (let) 1094
Rates:
Control of municipal utility rates; Pennsylvania and Wisconsin. (ed) 407, (let) 673

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

ELECTRIC POWER: Rates: (Cont.)
Municipal contracts with public utility companies in Pennsylvania; Full control of rates by the Public Service Commission.....(n) 981
Rio de Janeiro, Brazil, Vertical-shaft Pelton-type waterwheels of 19,000-hp. for the Pirahy power station of the street railway.....*124
Spaulding dam and South Yuba power development of the Pacific Gas & Electric Co. By H. C. Vensano *1163
Sun River Irrigation Project, Electric power to be used exclusively for construction work on the project, (n) 1259
Swiss hydro-electric station using water under 2800-ft. head..... *52
Transmission, Papers at annual convention of the American Institute of Electrical Engineers..... 79
Wachusett dam, Profitable state hydro-electric power plant.....(n) 297
Waldeck storage dam, on the River Eder, Germany. By Robert Grimshaw *852
Wisconsin water power law; All water-power developments under the control of the Railroad Commission 768
Electric railway valuation; Life of physical railway property; Abstract of a report of the joint Committee on Life of Railway Physical Property of the American Electric Railway Engineering and Accountants' Associations.... 972

ELECTRIC RAILWAYS:
American Electric Railway Association; Annual convention, Atlantic City, N. J., Oct. 13-17, 1913..... 837
Cleveland, Ohio, Arbitration of differences between city and Cleveland Ry. Co. completed and report presented .....(n) 262
Dallas, Texas, $2,000,000 terminal for interurban electric railways projected by Stone & Webster....(n) 77
Experimental electric carrier railways plant at Paterson, N. J.; For rapid transfer of mail and express. System of American Pneumatic Service Co. and Cambridge demonstration plant.....*637, *702
Future of the motor omnibus.....(ed) 1039, 1050, 1087
Kansas City, Clay County & St. Joseph Ry.; Problems of design and the more important details of construction. By Robert P. Woods..*688
Life of physical railway property; Abstract of a report of the joint Committee on Life of Railway Physical Property of the American Electric Railway Engineering and Accounts' Associations..... 972
Maintenance of electric railway equipment. By C. H. Quereau..... 28
Massachusetts, Control of group of electric railways secured by Sanderson & Porter, New York...(n) 323
New York City; Coöperative insurance for employees arranged by the Fourth Ave. Ry.....(n) 645
Richmond, Va.; Articulated street car put in service by the Virginia Railway & Power Co.....(n) 276
San Francisco, Calif.:
Municipal street-railway lines to furnish transportation for the Panama-Pacific Canal Exposition (n). 484
Net profit of the municipal railway for six months to July 31, 1913, (n) 484
Toronto, Ont., Municipal ownership of street railway and electric lighting systems considered.....(n) 90
Electric switchboards, Operating-control system of the Panama Canal locks *1323
Electric welding, Electric welding for track repairs and rail joints.....*298

ELECTRIC WIRING:
Creeping of cables.....(n) 73
Peculiar explosion at Hebburn-on-Tyne, England, due to formation of inflammable gas by the destructive distillation of bituminous insulation on buried electric wires .....(n) 553

ELECTRIFICATION OF STEAM RAILWAYS:
Canadian Northern Ry., Montreal tunnel and terminal section.....(n) 734
Direct current at 2400 volts to be used on electric traction system of the Chicago, Milwaukee & St. Paul Ry. .....(n) 1331
Norfolk & Western Ry.; Single-phase 11,000-volt electric traction for mountain section; Induction motors on the locomotives..(ed) 269, (n) 277, (n) 435

PAGE

ELECTRIFICATION OF STEAM RAILWAYS: (Continued)
Pennsylvania R. R., Germantown branch from Philadelphia to Chestnut Hill .....(n) 733
St. Gotthard Railway.....1159
Electrolysis. (See Concrete; Water mains.)
Elephants, Cargo of elephants rock a ship.....(n) 1188

ELEVATED RAILWAYS:
Boston, Mass.:
Comparative salaries of executive, legal and engineer officers of a rapid transit system.....(n) 537
Influence of petty pay-roll economies on labor conditions. By T. N. Ashton .....(let) 567
Chicago, Ill.:
New through route system of operating trains and a free transfer system put in operation Nov. 3, (n) 1056
Shifting the girders and columns of the Chicago Elevated Railway....*906
New York City:
Aggregate cost of new rapid transit lines under construction.....(n) 90
Summary of traffic on the city subway and the Manhattan and Bronx elevated railroads.....(n) 865
Elevators, Grain elevators. (See Grain elevators.)

EMBANKMENTS:
Railing with subsurface curb for shoulders of road embankments. By Roland Watts.....*1304
Railway embankment slid into lake near Piscotasing Station, on Canadian Pacific Ry., July 10. (n) 234
Suspension dumping bridge for building railway embankments.....*1024
Templates for embankment slopes. By M. D. Ewell.....*821
Eminent domain, Excess condemnation to be voted on in New York State, (ed) 768
Empiric formulas, Construction and use of. By Cyrus T. Brady, Jr.....*163
Employer and employee. (See Labor.)

ENGINEERING:
Advance of structural methods illustrated by the Standard Oil Co..(n) 946
Amateur, Flood prevention by means of beavers.....(n) 86
Applicants for engineering positions on the Federal Railway Valuation Board .....(ed) 422
Builders' license law for the city of Boston, Mass.: Ordinance for the control of building operations.... 640
Can engineers be trusted to arbitrate fairly and intelligently between the public interests and the property interests?..... 120
Chicago Technical League. By Louis A. Heyn.....(let) 1143
Civil engineer or dentist?.....(ed) 367
Code of ethics and recommended schedule of compensation of the Maine Society of Civil Engineers..1231
Collection and use of construction cost data 1305
Comments by Secretary Lane on conservation; Annual report of the Secretary of the Interior...(ed) 1312
Concerning engineering research—the useless and the useful. By E. A. Moritz .....(ed) 32, (let) 129
County engineers:
Building concrete bridges in rural Kansas .....(n) 974
Duties and trials of the county engineer .....(n) 1138
Results of a personal investigation of the holders of the offices of County Engineer and County Surveyor in the State of Kansas. By J. W. Mavity.....1189, (ed) 1196
Employment and investment combined: a warning.....(ed) 985, (let) 1143
Employment of engineers in the Federal Public Health Service..(ed) 1245
Engineer requested on Interstate Commerce Commission by American Institute of Consulting Engineers, (n) 1208
Engineering course for $20 in 1837... 562
Engineering principles applied to farm irrigation. By A. L. Harris.....*1172
Expediting progress on "rush" construction work. By James L. Stuart 818
Field for the inspector's efforts. By Arthur W. Tidd.....1030
Free public service by engineers. By Marshall Morris..(ed) 878, (let) 1198
Good roads extravagance and good sense in West Virginia.....(ed) 367
High price of capital: Money for productive enterprises hard to get, (ed) 618
How far must an engineer be guided by his client's resources?.....(lets), 1095, 1318

PAGE

ENGINEERING: (Continued)
Investigation of existing engineering structures. By Horace R. Thayer 609
Investigation of the New York State highway work .....(ed) 1142
Limitations of engineers. By A. O. Powell 305
Models in engineering design. By William M. Torrance.....(let) *1249
Mexico, American engineers in peril; New York "Times" Aug. 14..(n) 386
Modern technics and culture; Paper at Leipzig meeting of American Society of Mechanical Engineers... 123
Needed reform in the conduct of engineering competitions.(ed) 311,(n) 324
Neglected opportunity of the engineering graduate. By J. W. Mavity, 1189, (ed) 1198
Opportunities of the average man in the technical field. By O. E. Huebner 463
Panama-Pacific International Exposition of 1915, at San Francisco, Calif.: Construction work, site, planning, decoration and architectural and engineering design of the buildings: Electric light and power; gas, steam and compressed air; sewers and sanitary equipment; high-pressure fire-protection water system; fire protection; roads and pavements. By A. H. Markwart *895, *1070
Passing of Edisonian research..(ed), 717, 724
Preparation of engineering reports. By Edward Beattie Stephenson.....1218
Public Construction contracts; Some general principles applicable to...1017
Quantity surveying in the United States. By Leslie H. Allen..(ed), 877, (let) 988
Question whether a city engineering department should do city surveying for private parties in competition with private engineers..(n) 228
Random suggestions to the engineering school graduates of 1913....(ed) 271
Relations of consulting and municipal engineers in Great Britain. By H. C. H. Shenton..... 206
Should an engineer make himself financially responsible for his estimates? .....(lets) 85, 178
Should fees be charged for the use of plans by contractors estimating on work? .....(ed) 831
Solving the problem of "human engineering".....962, (let) 1094
Unfairness of organized labor. By W. J. Knight.....(let) 672
Why "safety first" is sound economy. By Alexander Haring.....1295

ENGINEERING COMPETITIONS:
Australian capital; Politician's control of engineering activities; sadly confused competition for new design of the new capital city, (ed) 563
Needed reform in the conduct of engineering competitions.(ed) 311, (n) 324
Premature engineering competitions, (ed) 311, (n) 324
Prize competition for improvement of navigation on Upper Rhine, Germany .....(n) 555
Prize of $10,000 for best automatic stop offered by New York, New Haven & Hartford R. R.....(n) 186
Vancouver, B. C., Georgia-Harris viaduct; a succession of concrete-encased steel Warren trusses, "mushroom" slabs, reinforced-concrete girders and steel-frame cantilevers; designed by C. A. P. Turner *344

ENGINEERING ETHICS:
Advertising an "institute of efficiency, (ed) 1037
Can engineers be trusted to arbitrate fairly and intelligently between the public interests and the property interests?..... 120
Chicago Technical League. By Louis A. Heyn.....(let) 1143
Code of ethics and recommended schedule of compensation of the Maine Society of Civil Engineers 1231
Code of ethics for the engineering profession of the American Society of Mechanical Engineers approved by that Society by a letter-ballot vote .....(ed) 1195
Free public service by engineers. By Marshall Morris..(ed) 878, (let) 1198
Illustrating the need of a code of ethics for engineers.....(ed) 31
Needed reform in the conduct of engineering competitions.(ed) 311, (n) 324
Premature engineering competitions, (ed) 311, (n) 324
Question whether a city engineering department should do city surveying for private parties in competition with private engineers.....(n) 228

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

ENGINEERING ETHICS: (Continued)
- Relations of consulting and municipal engineers in Great Britain. By H. C. H. Shenton..... 206
- Should an engineer make himself financially responsible for his estimates? By C. A. P. Turner, (lets) 85, 178

ENGINEERING LITERATURE:
- Eleventh year of the Engineering Literature section.....(ed) 1263
- Engineering English: Discussion of the teaching of English in engineering schools.....1914, (let) 1041
- Preparation of engineering reports. By Edward Beattie Stephenson...1218
- Title-page dates.....(ed) 1263

ENGINEERING NEWS:
- Index to Vol. LXIX; Date of mailing changed .....(ed) 125
- New home of; Erection work on a heavy printing house; Hill Publishing Co., New York City.....*1298
- Subscribers notified regarding index to Vol. LXIX.....(ed) 31

ENGINEERING ORGANIZATIONS:
- Change in Panama Canal organization and history of the Central Division .....(n) 833
- Chicago Technical League. By Louis A. Heyn .....(let) 1143
- Joint railway organization for the inspection of structural steel and steel rails. By A. W. Buel..(let) 86
- Organization for track-elevation work.*1307
- Organization of the Hartford, Conn., waterworks department.....1086
- Panama-Pacific International Exposition of 1915, at San Francisco, Calif. By A. H. Markwart.*895, *1070
- Provincial public works organization of the Philippine Islands and its engineering personnel. By E. J. Westerhouse *958
- Road organization; Complete reorganization of the New York State Highway Department recommended by the Board of Consulting Engineers 982
- Water-works organizations and operating methods: St. Paul, Minn., and San Diego, Calif. *475

Engineering profession: Proposed "American Engineering Association"; paper at annual convention of the American Institute of Electrical Engineers 77

Engineering reports, Preparation of engineering reports. By Edward Beattie Stephenson.....1218

ENGINEERING RESEARCH:
- Concerning engineering research—the useless and the useful. By E. A. Moritz.....(ed) 32, (let) 129

ENGINEERING SCHOOLS:
- Case School of Applied Science, Course in highway construction for prospective applicants for positions in the state highway service....(n) 1331
- Charlottenburg Technical College, Special course in stone testing....(n) 945
- Columbia University, Library of highway engineering founded by C. H. Davis .....(n) 1237
- Concerning engineering research—the useless and the useful. By E. A. Moritz.....(ed) 32, (let) 129
- East Pittsburgh plant of the Westinghouse Electric & Mfg. Co. summer course for electrical engineering teachers.....(n) 233
- Engineering course for $20 in 1837.. 562
- Engineering English: Discussion of the teaching of English in engineering schools.....914, (let) 1041
- Flourishing forestry school in operation in the Philippine Islands.(n) 1062
- Harvard University, New school for health officers.....(ed) 421, 430
- Industrial and Technical Education Conference organized in Philadelphia .....(n) 892
- Industrial education, Papers at the annual convention of the American Institute of Electrical Engineers. 78
- Iowa State College:
  - Funds appropriated by legislature for winter course in highway engineering .....(n) 1331
  - Iowa legislature appropriates $65,000 for new transportation building, (n) 233
  - Two-year trade-school engineering courses in connection with Engineering Department established, (n) 461
- Kansas State Agricultural College, Correspondence course in road building for state road overseers to be prepared.....(n) 1194
- Massachusetts Institute of Technology:
  - Four-year undergraduate course for training in science and engineering recommended.....(n) 518

PAGE

ENGINEERING SCHOOLS: Massachusetts Institute of Technology: (Continued)
- New course of instruction, aerodynamics .....(n) 268
- New school for health officers..(ed) 421, 430
- Plans for new buildings.....*1053
- Stone & Webster Engineering Corporation selected as construction engineers.....(n) 385
- Municipal College at Akron, Ohio, provided for.....(n) 946
- Neglected opportunity of the engineering graduate. By J. W. Mavity, 1189, (ed) 1196
- Ohio State University, Funds appropriated by legislature for winter course in highway engineering, (n) 1331
- Paper on hydraulic engineering education; Annual meeting of the Society for the Promotion of Engineering Education..... 46
- Pennsylvania State College, Thermal testing plant. By J. A. Moyer... 695
- Pratt Institute, Evening course for trade workers who wish to become teachers in vocational schools.(n) 1146
- Rensselaer Polytechnic Institute, $30,000 presented to establish two graduate fellowships in memory of Russell Sage.....(n) 1147
- Some random suggestions to the engineering school graduates of 1913.....(ed) 271
- Teaching mathematics to engineering students; Suggestions as to the teaching of pure mathematics. By Willis Whited..... 538
- U. S. Naval Academy, Graduate courses developed for training of young naval officers assigned to special lines of duty.....(n) 1147
- University of Colorado, One-year course of engineering instruction in public-health work established...(n) 1147
- University of Illinois:
  - Course in civic design or town planning. By Charles Mulford Robinson .....(n) 946
  - Large arch-truss drill-hall; Roof carried by a series of three-hinged arch trusses of novel design and construction; Armory for the University of Illinois, Urbana, Ill...*1182
  - Two weeks' course in highway engineering, Jan. 9 to 31, 1914.(n) 1194
  - Two weeks' course in highway engineering for new county and town highway superintendents....(ed) 1311
- University of Montana, Bozeman to be center for state engineering courses .....(n) 483
- University of Toronto, Twenty-fifth annual banquet; 50th anniversary of the entrance to the University of John Galbraith.....(n) 1237
- University of Washington, Snoqualmie National forest land allotted for forestry courses.....(n) 385

ENGINEERING SOCIETIES:
- Chicago Technical League. By Louis A. Heyn.....(let) 1143
- Employment department organized by Oregon Society of Engineers..(n) 905
- Fraternal American engineering society. By Walter M. Smyth, (ed) 369, (let) 772
- Gathering of Atlanta, Ga., engineers, (n) 197
- Institution of Mechanical Engineers, Benevolent fund established..(n) 1185
- London, England, Engineering society headquarters altered during the past three years.....(n) 1023
- Making membership in an engineering society a tangible asset..(ed) 369, (lets) 524, 772, 774, 1042, 1315
- Proposed "American Engineering Association"; Paper at annual convention of the American Institute of Electrical Engineers..... 77
- Should the United States participate in international congresses?..(ed) 176

ENGINEERS:
- Applicants for engineering positions on the Federal Railway Valuation Board .....(ed) 422
- Army:
  - Dan C. Kingman, Chief of Engineers; Biographical sketch of...*834
  - Preliminary report of Army Engineers on the Central States floods; central control recommended; reservoirs of no use, 725, (ed) 771
  - William R. Rossell, Chief of Engineers, Biographical sketch.....*321
- British, Report of British experts on a new water-supply for Ottawa, Ont.....1012, (ed) 1038
- Can engineers be trusted to arbitrate fairly and intelligently between the public interests and the property interests? 120

PAGE

ENGINEERS: (Continued)
- Chicago Technical League. By Louis A. Heyn.....(let) 1143
- City manager plan again, Comment on, (ed) 313
- Civil engineer or dentist?.....(ed) 367
- Compensation:
  - Code of ethics and recommended schedule of compensation of the Maine Society of Civil Engineers 1231
  - Comparative salaries of executive, legal and engineer officers of a rapid transit system; Boston, Mass.....(n) 537
  - Expert witness fees of engineers in Great Britain.....(n) 909
  - Fairly good fee for an engineer, 1012, (ed) 1038
  - Opportunities of the average man in the technical field. By O. E. Huebner 463
  - Remarkable professional fee of a consulting engineer.....(ed) 519
- County engineers:
  - Building concrete bridges in rural Kansas .....(n) 974
  - Duties and trials of the county engineer.....(n) 1138
  - Results of a personal investigation of the holders of the offices of County Engineer and County Surveyor in the State of Kansas. By J. W. Mavity.....1189, (ed) 1196
- Educational trip by engineers in a city department; Borough of Manhattan .....(n) 90
- Employment and investment combined: a warning.....(ed) 985, (let) 1143
- Employment department organized by Oregon Society of Engineers..(n) 905
- Employment, Employment bureau of Philadelphia Engineers' Club has proved a success.....(n) 946
- Employment of engineers in the Federal Public Health Service.....(ed) 1245
- Engineer as an economist..... 120
- Engineer requested on Interstate Commission by American Institute of Consulting Engineers.....(n) 1208
- Engineer principles applied to farm irrigation. By A. L. Harris.....*1172
- Engineers as members of public service commissions; a pertinent illustration .....(ed) 126
- Engineers' Committee of the American Society of Civil Engineers to draft a federal water law.....(ed) 934
- Engineers for the New York Public Service Commissions and as heads of New York City Departments.....1045
- Engineers vs. lawyers or progress vs. precedent .....(n) 813
- Field for the inspector's efforts. By Arthur W. Tidd.....1030
- Free public service by engineers. By Marshall Morris...(ed) 878, (let) 1198
- Gathering of Atlanta, Ga., engineers, (n) 197
- Grades in examinations under Railway Valuation Board completed by the Civil Service Commission (ns), 990, 1160, 1208
- How far must an engineer be guided by his client's resources?(lets) 1095, 1318
- Interstate railway valuation board of engineers makes no appointments as yet to subordinate positions, (let) 990, (ns) 1160, 1208
- Investigation of New York State Highway work.....(ed) 1142
- Licensing of:
  - Builders' license law for the city of Boston, Mass.; Ordinance for the control of building operations, 640, (n) 1259
  - Illinois law for licensing mason contractors 813
- Limitations of engineers. By A. O. Powell 305
- Making membership in an engineering society a tangible asset...(ed), 369, (lets) 524, 772, 774, 1042, 1315
- Mexico, American engineers in peril; New York "Times" Aug. 14..(n) 386
- Models in engineering design. By William M. Torrance.....(let) *1249
- Needed reform in the conduct of engineering competitions. (ed) 311, (n) 324
- Neglected opportunity of the engineering graduate. By J. W. Mavity, 1189, (ed) 1196
- On self-appointed and popularly-elected municipal experts.....(ed) 368
- Opportunities of the average man in the technical field. By O. E. Huebner 463
- Optimistic view of the draftsman's job. (including poem). By E. A. Van Deusen .....(let) 85
- Philippine Islands, Provincial public works organization and its engineering personnel. By E. J. Westerhouse *958
- Preparation of engineering reports. By Edward Beattie Stephenson.....1218

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

ENGINEERS: (Continued) PAGE
Question whether a city engineering department should do city surveying for private parties in competition with private engineers.....(n) 228
Relations of consulting and municipal engineers in Great Britain. By H. C. H. Shenton..... 206
Road organization; Complete reorganization of the New York State Highway Department recommended by the Board of Consulting Engineers 982
Should an engineer make himself financially responsible for his estimates? .....(lets) 85, 178
Solving the problem of "human engineering" .....962, (let) 1094
Some random suggestions to the engineering school graduates of 1913, (ed) 271
Unfairness of organized labor. By W. J. Knight.....(let) 672
What is a leveler, and why?...*1129, (ed) 1141, (let) 1252
Why "safety first" is sound economy. By Alexander Haring.....1295
Engineers and Architects Club of Louisville, Ky., Free public service by engineers. By Marshall Morris, (ed) 878, (let) 1198
Engine-houses. (See Railway structures.)
England, State purchase of railways in Great Britain. By H. Raynar Wilson .....1117, (ed) 1140
English, Engineering English; discussion of the teaching of English in engineering schools.....914, (let) 1041
Escobar, Robert, Biographical sketch of. By Charles MacDonald....276, (let) 472, (Erratum) 567
Estimating, Quantity surveying in the United States. By Leslie H. Allen .....(ed) 877, (let) 988

ESTIMATES:
Collection and use of construction cost data 1305
Construction and use of empiric formulas. By Cyrus T. Brady, Jr....*163
Should an engineer make himself financially responsible for his estimates? .....(lets) 85, 178
Should fees be charged for the use of plans by contractors estimating on work? .....(ed) 831
Ether, Storing and handling inflammable liquids; Martini & Huneke safety system for.....*1011
Excavating machinery, Simple power scraper outfit used for earth stripping; Middlebury, Vt.....(n) 1035
Excavating machines, Rules for laying up idle equipment..... 820

EXCAVATION:
Arrowrock Dam, Idaho, Excavation for; Drag-line excavator, orange-peel buckets, skips from cableways, hydraulic jets, blasting used in loosening rock. By Charles H. Paul *93
Belt conveyor used for back-filling a sewer .....(n) 196
Convenient earthwork table. By Philip R. Hill.....*825
Excavating a bridge abutment through quick-sand. By Frank I. Barrett.*608
Excavating with large scrapers; University of Illinois; Maney scraper. By A. B. McDaniel.....*1302
Handling cellar excavation with a conveyor .....(n) *823
Hydraulic method, Dipper dredge with hydraulic jets for leveling the spoil banks. By Chester B. Loomis, *196 (erratum) 472
Quick lime for thawing frozen ground, (n) 364
Unloading earth from cars by sluicing. By J. C. Lathrop..... 609

EXHIBITIONS:
Anglo-American exhibition to be held in London from May to October, 1914 .....(n) 293
City-planning exhibition to be held in New York City last week in November .....(n) 946
Good road exhibit to be held at Ohio State Fair Sept. 1-5.....(n) 387
Exhibits, City planning exhibition at New York Public Library, Nov. 24. (n) 1208
Explosion engines. (See Gas and oil engines.)

EXPLOSIONS:
Peculiar explosion at Hebburn-on-Tyne, England, due to formation of inflammable gas by the destructive distillation of bituminous insulation on buried electric wires .....(n) 553
(See Accidents, Explosions.)

EXPLOSIVES: PAGE
French naval laboratory to be opened at Savranlivry, France.....(n) 1192
Selection of explosives for engineering work; Comparative energies of commercial explosives..... 495

EXPORTS:
Automobile exports in fiscal year 1913, (n) 309
Growth of exports of machinery in 1912 .....(n) 80
Increase in the exports of manufacturers of the United States in 1913, (n) 1227
Manufactures the chief feature in growth of export trade of the United States during the last ten years .....(n) 283

EXPOSITIONS:
Anglo-American Exposition to be held in London, May-October, 1914..(n) 946
International Building Exposition, Leipzig, Germany, announces awards .....(n) 1260
Panama-Pacific International Exposition of 1915, at San Francisco, Calif.; Construction work, site, planning, decoration and architectural and engineering design of the buildings; Electric light and power; gas, steam and compressed air; sewers and sanitary equipment; high-pressure fire-protection; Roads and pavements. By A. H. Markwart.....*895, 1070
Panama-Pacific, Wrong way to aid the Exposition; Kahn law, recently enacted by Congress for the avowed purpose of inducing foreign owners of patented and copyrighted articles to make exhibits at San Francisco .....(ed) 1311

EXPRESS RATES:
Express rates of country revised by Interstate Commerce Commission decision of Aug. 4.....(n) 277
Interstate Commerce Commission's revision of express rates.....(ed) 719
Reforms needed in parcel-post administration .....(ed) 770
Express transfer railways, Experimental electric carrier railway plant at Paterson, N. J.; for rapid transfer of mail and express. System of American Pneumatic Service Co. and Cambridge demonstration plant.....*637, *702

EXTENSOMETERS:
Live-load strain-gage using scissors principle; designed by J. E. Howard, Bureau of Standards, Washington, D. C.....*701
Strain-gage measurements of stresses in arches .....(n) 1308
Extravagance, Age of; National debts, (n) 1175

F

Fans. (See Blowers.)

FERRIES:
Car-float service on the Chicago River, (n) 574
River ferry as a stream-gaging station, on the John Day River in Oregon; U. S. Geological Survey. By W. C. Sawyer *610
Fertilizer, Kelp as a source of potash and as a fertilizer.....(n) 1171
Field glasses, Field glasses for track inspection used on Prussian State Railway .....(n) 173
Filing devices, Hook for drainage in vertical filing cases.....(n) *614

FILING SYSTEMS:
Daily reports on pipe-laying; Bureau of Distribution, Department of Water, San Diego, Calif.....(n) *1310
Motor inspection and maintenance in industrial plants; Edison Electric Illuminating Co., Brooklyn, N. Y. By F. E. Hanchette.....*746
Filtration of waters. (See Water purification.)

FINANCE:
Federal control of stock and bond issues.....(ed) 935
High price of capital; money for productive enterprises hard to get, (ed) 618
More revelations in "high finance"; Investigation of the St. Louis & San Francisco R. R. Co., by the Interstate Commerce Commission, (ed) 1091
New York, New Haven & Hartford R. R., Investigation of financial and other matters; investigation of rear collision of June 12 at Stamford, Conn.....(ed) 126

Fire alarms, New automatic fire alarm device; described by F. A. J. Fitzgerald in the November "Journal" of the Franklin Institute.....(n) 1291
Fire engines, Tests of automobile pumping engines under the direction of the Committee on Exhibits, International Association of Fire Engineers, New York City.....(n) 659

FIRE PREVENTION:
Domestic and foreign records of fire loss for 1912..... 405
Fire-prevention conference being arranged by Fire Prevention Commission of Philadelphia.....(n) 289
Storing and handling inflammable liquids; Martini & Huneke safety system for.....*1011

FIREPROOFING:
American Railway Bridge and Building Association; Committee report.... 890
Fire, load and water test upon cinder-concrete, terra-cotta and gypsum floor arches. By Harold Perrine.*374
Theory of the penetration of heat in solid materials. By L. R. Ingersoll 866

FIRE PROTECTION:
Automatic revolving door, collapsible in case of panic.....(n) 555
Automatic sprinklers as life savers. By Sidney G. Koon.....(let) 373
Charges for public water service to private fire protection systems. By W. E. Miller.....1168
Dismissing factory employees daily by ringing the fire bell.....(n) 461
Domestic and foreign records of fire loss for 1912..... 405
Federal coöperation, in fire protection, with West Virginia.....(n) 946
Fire, load and water test upon cinder-concrete, terra-cotta and gypsum floor arches. By Harold Perrine..*374
Flue gas for fire fighting on shipboard.....1235, (ed) 1247
Inert gases for fighting fire at sea, 1235, (ed) 1246
New automatic fire alarm device; described by F. A. J. Fitzgerald in the November "Journal" of the Franklin Institute.....(n) 1291
Panama-Pacific International Exposition of 1915, at San Francisco, Calif.; Electric light and power; gas, steam and compressed air; High-pressure fire-protection. By A. H. Markwart.....*1070
Paper on private fire services; Annual convention of the American Water Works Association..... 43
Railroad speeder for fire protection used by the United States Fire Service .....(n) 634
Safeguarding life in factory fires; Life hazard in crowded buildings due to inadequate exits.....(ed) 224, *228, (let) 373
Storing and handling inflammable liquids; Martini & Huneke safety system for.....*1011
Water-works charges for private fire protection; a valuable study of the principles and practice; by Leonard Metcalf, consulting engineer, Boston, Mass.....1236
Flashboards, Diversion dam with unusually high steel flashboards. By M. C. Hinderlider.....*910

FLOOD PREVENTION:
Ambitious river regulation plan, in a bill introduced in the Senate of the United States by Senator Newlands of Nevada.....(ed) 470
Bill for flood protection drafted by National Drainage Congress.....(n) 47
Cairo, Ill., Floods and levees at one of the most vulnerable points from a flood standpoint in the Mississippi Valley.....*104
China, Chinese famine and proposed flood prevention. By Charles Davis Jameson *588
Columbus, Ohio:
Flood-prevention investigations making good progress.....(n) 234
Recommendations of the consulting hydraulic engineers.....*631
Dayton, Ohio, Preliminary report on flood protection..775, (lets) 880, 989
Dry weather levee failures.....(ed) 1037
Electric hydraulic dredge; East Side Levee and Drainage District; levee system, East St. Louis, Ill..*432
Helena, Ark., Sloughing off of the Mississippi levee at Helena, Ark., *1014, (let) 1037
Imperial Valley, Calif., Repairs to the Imperial Valley irrigation system, (n) 1021

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

FLOOD PREVENTION: (Continued)
Lima, Ohio, Flood protection; Report on protective work against inundation by the Ottawa River, made by the W. J. Sherman Co., Consulting Engineers, of Toledo, Ohio 828
Mississippi River:
Adoption by a New York City commercial organization of a resolution approving the fantastic scheme of Mr. Riker.....(ed) 1091
Flood-control problem summarized..1121
Ohio:
How far must an engineer be guided by his client's resources?..(lets) 1095, 1318
Systematic stream-gaging by state authorities.....(n) 1208
Preliminary report of Army Engineers on the Central States floods; Central control recommended; reservoirs of no use.....725 (ed) 771
Sacramento Valley, Calif., Large clam-shell dredges; Levee building methods and standards in California. By Fred H. Tibbetts....*456
Starting the work of flood protection, 725, (ed) 771
Stocking streams with beavers....(n) 86
Troy, Ohio, Report on flood protection by the Morgan Engineering Co..*1292

FLOORS:
Concrete:
Collapse of a reinforced-concrete frame in a building, Vancouver, B. C. By A. P. Hueckel.....*290
Hardening material; 95% iron dust or iron flour mixed with cement for finishing the surface of concrete floors.....(n) 981
Stresses in a reinforced-concrete floor slab under heavy load; New freight terminal of the Minneapolis, St. Paul & Sault Ste. Marie Ry. in Chicago.....(n) 869
Fire, load and water test upon cinder-concrete, terra-cotta and gypsum floor arches. By Harold Perrine..*374
Specially designed concrete-floor construction, Warehouses on Made Land, Manila, P. I. By John W. Graham *554
Tests, Stresses in a reinforced-concrete floor slab under heavy load; New freight terminal of the Minneapolis, St. Paul & Sault Ste. Marie Ry. in Chicago.....(n) 869
Florida Everglades, Report on, by a board of engineers composed of Prof. Daniel W. Mead, of Chicago, and the University of Wisconsin; Allen Hazen, of New York, and Leonard Metcalf, of Boston, Mass. 835
Flue gas, Flue gas for fire fighting on shipboard.....1235, (ed) 1247

FLUMES:
Irrigation flume built for California Indians. By H. K. Palmer.....*553
Lining an irrigation ditch with Hess metallic flumes. By Elbert M. Chandler *464
Metal flumes for irrigation canals; details of joints and supports, *1077, (let) *1316
Methods of current-meter rating, California Development Co. By J. B. Brown.....*712
Puntledge River power development, Vancouver, B. C.; Novel features in flume and penstock design. By F. M. Kirsch....*793, (ed) 829, (let) 1094
Force, Recommendations concerning the units of. By Edward V. Huntington.....400, (ed) 431

FORESTS AND FORESTRY:
Ambitious river regulation plan, in a bill introduced in the Senate of the United States by Senator Newlands of Nevada.....(ed) 470
Coöperation for protection from forest fires .....(n) 518
Development of water power in the national forests..... 573
Diminishing timber supply and municipal forests.....(ed) 469
Effect of chestnut blight on timber, (n) 111
Effect of forest fires on standing hardwood timber .....(n) 191
Effect of forests on climate and floods, Artificial controls for stream gaging stations; Small barriers of concrete or of rubble leveled off with cement-mortar; Types of artificial barriers and rating curves for each type. By G. S. Strout, (let) 226
Encouragement of forestation by the Canadian Pacific Ry.....(n) 155
Federal power over public lands held supreme over state jurisdiction, (n) 1260

PAGE

FORESTS AND FORESTRY: (Cont.)
Flourishing forestry school in operation in the Philippine Islands, (n) 1062
Forest products in 1912; United States Bureau of the Census.....(n) 495
Germany; Six thousand professional foresters in Germany.....(n) 548
Good work by state conservation commissions .....(nd) 81
Lumber statistics for 1911; United States Bureau of the Census..(n) 387
National or state control of the gifts of nature; National Conservation Congress. By Clarence T. Johnson (ed) 1092, 1106, (lets) 1199, (n) 1316
Paper on reforestation of watersheds; Annual convention of the American Water Works Association.... 43
Receipts from national forests of the United States for year ended June 30, 1913.....(n) 283
Road funds from the national forests, (n) 801
Seattle, Wash., water supply, Proposed reforestation of the Cedar River watershed *480
State foresters employed in 22 states, (n) 665

FOUNDATIONS:
Accident to the foundations of the Pearl Harbor dry dock.....(n) 276
Bridge foundations:
Borings for new Thames River bridge, New London, Conn....(n) 528
Cantilever bridge over the Mississippi River at Memphis, Tenn.; Arkansas & Memphis Railway & Terminal Co., Ralph Modjeski, Consulting Engineer.....*930
Earth pressure against foundation walls; Failure of an 18-in. rubble wall at Manhattan, Kansas. By R. A. Seaton.....(let) *721
Excavating a bridge abutment through quicksand. By Frank I. Barrett *608
Pont Notre-Dame reconstruction, Paris, France; Arch replacement under traffic.....*1211
Self-draining foundation pit on the bank of a river; Excavation of piers at the Oregon-Washington R. R. & Navigation Co.'s viaduct across the Spokane River, Spokane, Wash. By John W. Cunningham *1024
Building Foundations:
Guaranty Trust Co.'s new building, New York City; interesting problems in the foundations and steel construction. By Eugene W. Stern.*258
Office building of the Consolidated Gas Co., New York City; Details of unusual features; Construction methods, etc.....*1275
Special concrete foundations in the Manila Port District. By John W. Graham.....*554
Structural features of a Chicago, Ill., bank building; Continental & Commercial National Bank Co.....*976
Underpinning the old Mills Building, for Morgan Bldg., Broad & Nassau Sts., New York City.....*257
Dam foundations:
Arrowrock dam, Idaho, Excavation for; Drag-line excavator orange-peel buckets, skips from cableways, hydraulic jets, blasting used in loosening. By Charles H. Paul. *93
Failure of the main coffer-dam No. 48, Ohio River. By J. C. Oakes..*231
Foundation difficulties at Hales Bar dam .....*949, (ed) 1038
Neglected first principles of masonry dam design.....*442, (lets) 623, 832
Reconstructing the foundation of the Elwha River dam; Olympic Power Co., Port Angeles, Wash.....*1258
Grain elevator sinks into the ground, Winnipeg, Man., Oct. 18....(ns), 892, *944, 1107
Grouted foundations for reinforced-concrete wharf; harbor improvement at Iloilo, Philippine Islands. By Wilson T. Howe.....*1003
Interesting pile failure; Montgomery Dock No. 1, Portland, Ore. By John W. Cunningham.....*465
Levees, Building a levee across an old sawdust bed.....*169
Pumping out foundation pits.....(n) 174
Relative merits of different kinds of slag .....(n) 131
Rock grouting and caisson sinking for the Hales Bar dam, Tennessee River, Hales Bar, Tenn. By A. H. Horton ..*949, (ed) 1038, (let) 1143
Sewer foundations:
Sewer construction in quicksand; West Liberty, Iowa.....1027

PAGE

FOUNDATIONS: Sewer Foundations: (Continued)
Subaqueous sewer construction, Brooklyn, N. Y.; Sewerage system constructed in fine, running sand at from 1 to 14 ft. below ground waterlevel, on plank platforms supported by piles driven deep enough to prevent injury to the sewers by loss of the surrounding sand when excavations are made in the vicinity *1064
Slag foundation for a 305-ft. steel chimney; Calumet & Arizona Mining Co., Douglas, Ariz. By C. W. Cromwell *1167
Street collapse, Randolph St., Chicago, Ill., opposite a new 12-story extension of the Marshall Field dry-goods store.....*1206
Foundries, Rapid erection of a steel-frame foundry; National Brake & Electric Co., Milwaukee, Wis....*1025
Foundry practice, American Foundrymen's Association and the American Institute of Metals; annual meeting, Chicago, Oct. 13-16.... 827
Foundry work, Cast-steel dome for the drainage shaft of the Hudson River siphon; Description of and method of manufacture and transportation *696
Franchises, American Electric Railway Association; Address at annual convention, Atlantic City, N. J., Oct. 13-17, 1913..... 837

FRAUDS:
Advertising an "institute of efficiency," (ed) 1037
Employment and investment combined, a warning..(ed) 985, (let) 1143
More revelations in "high finance"; investigation of the St. Louis & San Francisco R. R. Co., by the Interstate Commerce Commission..(ed) 1091

FREIGHT HANDLING:
Cableway for railway lumber cars. By M. M. Cooke.....*939
Chicago, Ill.:
Freight terminal; all track space, team yards and freight houses on an upper floor or deck and the utilization of the space at ground level for freight storage.....*378
Suggested changes in railway terminals; extract from a report by John F. Wallace to the Committee on Railway Terminals of the City Council of Chicago....923, *1154
Concreting train using a drag-line excavator.....1031, (let) 1198
Electric carrier railways for rapid transfer of mail and express; experimental plant at Paterson, N. J. System of American Pneumatic Service Co. and Cambridge demonstration plant.....*637, *702
Falling steel shaft sank ship in East River, Dec. 8.....(n) 1260
New York City, Handling west-bound freight on the North River railroad piers. By W. J. Barney....*309
Record freight-car handling on Pennsylvania R. R. for July, 1913, (n) 276
Unloading broken stone or gravel from cars by scraper. By Ralph Bennett *1030
Freight rates. (see Railway rates.)
Frost, Quick lime for thawing frozen ground .....(n) 364

FUELS:
Oil fuel, Distillation of oil from bituminous shales.....(n) 479
Storing and handling inflammable liquids; Martini & Huneke safety system for.....*1011

FURNACES:
Development of improved gas-heating appliances; inventions of C. E. Lucke, Professor of Mechanical Engineering, Columbia University, New York City.....*1188
(See also Blast furnaces.)

G

GAGES:
Live-load strain-gage using scissors principle; Designed by J. E. Howard, Bureau of Standards, Washington, D. C.....*701
Special rain gage with large storage reservoir used by U. S. Geological Survey .....(n) 209
Gaillard, David Du Bose, Biographical sketch of.....1206
Galveston, Tex., Twelve inches of rain in twelve hours. By A. T. Dickey 945
Garbage and refuse collection, Uniform statistics of refuse collection and disposal 678

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

GARBAGE AND REFUSE DISPOSAL: PAGE
- Australia, Authority to order municipalities to build destructors for domestic garbage.....(n) 595
- Camp Hill View sanitation, Catskill Aqueduct; General description; Sanitary conveniences; Sanitary clauses of the contract; Carrying out of the sanitary measures. By Arthur W. Tidd.....*752
- Chicago, Ill.:
  - Garbage-disposal problem reaches acute stage.....(n) 277
  - Purchase of the plant of the Chicago Reduction Co. authorized....(n) 357
  - City agrees to purchase plant of Chicago Reduction Co.....(n) 484
  - Garbage-disposal situation unchanged, 733, (n) 779
  - Garbage-disposal situation takes another turn.....(n) 842
  - Chicago Reduction Co.'s plant to be acquired by city by condemnation proceedings .....(n) 989
- Four garbage-disposal contracts. (ed) 718
- Columbus, Ohio:
  - Operations of the garbage-reduction plant, 1912.....562
  - Stable manure collection and disposal in 1912.....(n) 525
- Los Angeles, Calif.:
  - Latest garbage-disposal contract. By E. Allen Phillips....(ed) 422, 429
- Four garbage-disposal contracts..(ed) 718
- Garbage-disposal contract made with C. C. Crouch to run ten years. (n) 1107
- New York City:
  - Four garbage-disposal contractors, (ed) 718
  - Garbage disposal contract; Contractor agrees to pay the city for garbage delivered to certain points of deposit on the waterfront..267, (ed) 269
- Philadelphia, Penn., Four garbage-disposal contracts.....(ed) 718
- Short-term garbage-reduction contracts and municipal ownership.....(ed) 31
- Small municipal waste incinerators to be used at Glendale, Calif...(n) 1179
- Uniform statistics of refuse collection and disposal..... 678

GARBAGE REDUCTION:
- Chicago, Ill., Chicago Reduction Co.'s plant to be acquired by city by condemnation proceedings....(n) 989
- Columbus, Ohio, Operations of the garbage-reduction plant, 1912.... 562
- Short-term garbage-reduction contracts and municipal ownership....(ed) 31

GAS:
- Acetylene for lighting block signals tried by the Boston & Maine R. R. at Reading, Mass., and the Chicago Great Western R. R. at Maywood, Ill.....(n) 29
- Astoria tunnel for gas mains of the Consolidated Gas Co. under the East River, New York City. By Harold Carpenter.....*737
- Development of improved gas-heating appliances; Inventions of C. E. Lucke, Professor of Mechanical Engineering, Columbia University, New York City.....*1186
- Inert gases for fighting fire at sea, (ed) 1246, 1235
- New York City, King's County Gas Co. rates decision: True value of public-utility property as it affects public welfare.....(ed) 367
- Pipe line 250 miles long from West Virginia Gas Fields to Louisville, Ky .....(n) 1113
- Rates, Control of municipal utility rates; Pennsylvania and Wisconsin. By R. S. H..(ed) 467, (let) 673

GAS AND OIL ENGINES:
- Cooling a gas engine by internal injection; Hopkinson scheme of gas-engine cooling by injection water.*594
- Diesel engines:
  - Diesel electric motor cars on Swedish State Rys.....(n) 605
  - Diesel engine manufacture in the United States.....(ed) 1139
  - Diesel engine ship "Hagen" at New York City.....(n) 29
  - Diesel engine ship "Wotan" largest single-screw oil motor ship yet built .....(n) 833
  - Investigations and experimental researches for the construction of my large oil engine. By H. Junkers 141
  - Locomotives, First locomotive to be built; General principle of operation of Diesel oil-engine locomotive .....*656, (ed) 670
- Performance of the oil-engine ocean vessel "Christian X" of the Hamburg-American Line..... 847
- Evolution of the gasoline rock drill, *933, (ed) 933

GAS AND OIL ENGINES: (Cont.) PAGE
- Gasoline motor freight and switching locomotive; Minneapolis & Northern Ry.....*745
- Inland navigation barges with producer-gas engines; Alabama & New Orleans Transportation Co. to operate between the coal fields of Alabama and the city of New Orleans, La.....*1109
- Investigations and experimental researches for the construction of my large oil engine. By H. Junkers 141
- Rice gasoline rock drill; a free piston gasoline rock drill. By M. D. Baldy ....*913, (ed) 933, (let) 1041
- Speed of 3310 r.p.m. established for an automobile motor.....(n) 205
- (See also Turbines, Gas.)
- Gas and oil pumps, Tests of the direct-acting explosion pumps (Humphrey design), at Chingford, England, (n) 1331

GAS PRODUCERS:
- Inland navigation barges with producer-gas engines; Alabama & New Orleans Transportation Co. to operate between the coal fields of Alabama and the city of New Orleans, La.....*1109
- Producer gas plant a feature of plant of Barnhart Bros. & Spindler, Chicago, Ill.....(n) 1260
- Gasoline, Storing and handling inflammable liquids; Martini & Huneke safety system for.....*1011
- Gates, Adjustment of the devices of hinge, miter ends and sills of Panama Canal lock gates to prevent leakage.....*744
- Gavels, Historic gavel made for Pittsburgh convention of Illuminating Engineering Society.....(n) 574

GEARS AND GEARING:
- Gearing for operating a 36-ft. bascule bridge by hand.....*665
- Practical chart for determining the horse-power of spur gears. By Frederic W. James.....*714, (n) 937
- General Contractors' Association, Resolution on fees to be charged for the use of plans by contractors estimating on work.....(ed) 831
- Geodesy. (See Surveys and surveying.)
- Geology, Sliding ground in Culebra cut, Panama Canal. By Donald F. MacDonald 408
- Girders. (See Beams; Plate girders.)
- Government, Some reasons for the increase in public debt and the raising of tax rates.....(ed) 221

GOVERNMENT OWNERSHIP:
- British imperial wireless telegraph system agreement with the Marconi Co. .....(n) 513
- Good work by state conservation commissions .....(ed) 81
- Independent opinion on the United States Irrigation Service.....(ed) 987
- Profitable state hydro-electric power plant; Wachusett dam.....(n) 297
- Some reasons for the increase in public debt and the raising of tax rates .....(ed) 221
- State hydro-electric power system to be built in Prussia.....(n) 483
- State purchase of railways in Great Britain. By H. Raynar Wilson, 1117, (ed) 1140
- State railway control in the United States. By H. Raynar Wilson, 1117, (ed) 1140

GRADE CROSSINGS:
- Condition of railroad grade crossings in southern New Jersey.....(n) 553
- Death on grade crossings in New York State numbered 13 during November .....(n) 1208
- Elimination:
  - Organization for track-elevation work *1307
  - Pennsylvania R. R., Grade elevation and six-tracking at Rahway, N. J. By John Jervis Vail.....*1118
  - St. Louis, Mo., Grade crossing elimination discussed and reports made to Missouri Public Service Commission .....(n) 905
  - Track elevation and portable concreting plant; Chicago, Milwaukee & St. Paul Ry.....*26, (n) 365
- Highway grade crossings on Pennsylvania R. R. system.....(n) 626
- Graft, Investigation of New York State highway work.....(ed) 1142

GRAIN ELEVATORS:
- Explosion of Husted Milling & Elevating Co. plant, Buffalo, N. Y., June 24..(ns) 47, *88, (ed) 223, 386, 1331
- Grain elevator sinks into the ground, Winnipeg, Man., Oct. 18.....(ns), 892 *944, 1107

GRAIN ELEVATORS: (Continued) PAGE
- Straightening grain elevator of Canadian Pacific Ry. at Transcona, Man., decided upon.....(n) 1107

GRANDSTANDS:
- Baseball stand collapsed, Tulsa, Okla., Oct. 28.....(n) 946
- Stand collapsed at De Pauw University, Green Castle, Ind., Nov. 1..(n) 1055

Gravel, Unloading broken stone or gravel from cars by scraper. By Ralph Bennett *1030

Great Britain, State purchase of railways in Great Britain. By H. Raynar Wilson .....1117, (ed) 1140

GREAT LAKES:
- Damage caused by severe storm of Nov. 11.....(n) 1056
- Recent disasters to lake shipping. (ed) 1141

Grinding machines, Electric rail-grinding machine *1181

GROUT:
- Rock grouting and caisson sinking for the Hales Bar Dam; Tennessee River, Hales Bar, Tenn. By A. H. Horton....*949, (ed) 1038, (let) 1143
- Walls made of cement grout; Middleburg, Va.....(n) 1036
- (See also Concrete.)

Guard rails, Railing with subsurface curb for shoulders of road embankments. By Roland Watts.....*1304

Gypsum, Fire, load and water test upon cinder-concrete, terra-cotta, and gypsum floor arches. By Harold Perrine *374

H

HARBORS:
- Atlantic City, N. J., Channel and beach maintenance problem; Absecon Inlet on the north shore of Atlantic City, N. J.; Method of maintaining channel without injury to the beach by dredging only. *150, (let) 523
- Chicago, Ill.:
  - Bypass channel on Chicago River being partially destroyed.....(n) 435
  - Harbor and subway plans..... 395
  - Outer harbor; Indiana St. pier, 3000 ft. long and 292 ft. wide; alternative design for pier, with concrete sheet piling.....*552
- Hamburg, Germany:
  - Basalt facing for concrete wall.... 929
  - Mechanical freight and cargo handling equipment. By I. F. Bubendey *189
  - Typical Hamburg quaywall.....*938
- Hudson Bay, Sir William Van Horne, Criticism of.....(ed) 1311
- Kobe, Japan, Harbor construction. By Wilson T. Howe.....*556
- Liverpool, England, Extensive dredging operations to keep approach channels to proper depth.....(n) 668
- New York:
  - Discharge of Passaic Valley sewage into New York Bay.....(n) 434
  - Handling west-bound freight on the North River railroad piers. By W. J. Barney.....*309
  - Figures of amount of business of the port of New York and other cities, for fiscal year ended June 30, 1913 .....(n) 234
  - Large pier and industrial development proposed for west shore.(n) 780
  - New dry dock contemplated....(n) 946
  - Pollution. (See Sewage disposal.)
- Oakland, Calif., Hydrographic surveying; Oakland Harbor development, California. By Fred W. Johnson..*362
- Rockhaven, N. D., Boat ways of reinforced-concrete for Missouri River Fleet of United States Engineer Corps. By S. R. Morrow.....*645
- Silting of harbors and effect of piers and jetties upon the movements of sand .....(n) 644
- Yokohama, Japan, Harbor construction. By Wilson T. Howe.....*556

Hartford, Conn., Organization of the water-works department.....1086

Hawaiian Islands, Average rainfall of little over 1 in. per day on Island of Maui .....(n) 245

HEAT:
- Theory of the penetration of heat in solid materials. By L. R. Ingersoll 866
- Thermal testing plant at the Pennsylvania State College. By J. A. Moyer 695
- Tropical seas, Neglected source of power in nature.....250, (ed), 270, (let) 425

HEATING AND VENTILATION:
- Service equipment of the Samaritan Hospital, Troy, N. Y. By C. F. Herington *108

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

HEATING AND VENTILATION: (Continued)
Studies in air washing; Condensed from a paper read before the Sanitary Engineering section of the American Public Health Association at Colorado Springs, September, 1913. 571
Theory of the penetration of heat in solid materials. By L. R. Ingersoll 866
Ventilation problems to be studied during next four years by commission of college professors. (n) 234

HIGHWAY COMMISSIONS:
Illinois, Highway administration advanced materially under new law. (n) 161
Iowa, New Iowa road law. By A. Marston 131
New York State:
Investigation of highway work. (ed) 1142
Long-term guarantees on State highway contracts. By F. R. Upton. (ed) 1196, (let) 1316
Prospects of state highway administration (ed) 829
Regulations issued for protecting state and county highways. (n) 857
Road organization; Complete reorganization of the New York State Highway Department recommended by the Board of Consulting Engineers 982
Specifications for State highway work 1203
Pennsylvania, One way to cure bad roads; Indictment of State Highway Commissioner, District Superintendent of Highways, Chief Engineer and State Road Inspector for misdemeanor in allowing several state highways to remain in an impassible condition. (ed) 617
Resolutions adopted by the American Road Congress at Detroit. (n) 780
Highways. (See Roads.)

HOISTING APPARATUS:
Falling steel shaft sank ship in East River, Dec. 8. (n) 1260
Handling rails and heavy track material by machinery. By W. E. Davin 611

HOISTING MACHINERY:
Building with traveling tower-cranes. *814, (n) 1310
Contract for the largest electric hoist in America. (n) 1257
Hoisting heavy girders 250 ft. above the street; Consolidated Gas Co. building *275
Three ways of rigging a derrick-boom end (n) *1035
Horses, Are horses' feet harmed by concrete paving? (n) 1056
Horseshoes, Horseshoe that will minimize road damage (n) 157
Hose, Standardization of hose and hydrant connections 289
Hospitals, Service equipment of the Samaritan Hospital, Troy, N. Y. By C. F. Herington *108
Hudson Bay, Sir William Van Horne, criticism of, as a port. (ed) 1311
Hurricanes. (See Accidents, Wind storms.)

HYDRANTS:
Standard specifications for waterworks hydrants and valves; American Water Works Association 265
Standardization of hose and hydrant connections 289
Water-works charges for private fire protection; a valuable study of the principles and practice; by Leonard Metcalf, consulting engineer, Boston, Mass. 1236
Hydraulic buffers, Test of a hydraulic buffer for railroad terminal stations. (ed) 519 *526

HYDRAULICS:
Amount of water required for canal lockage. By C. T. Schwarze. (let) 936
Application of the flow-summation curve to problems of stream regulation and storage. By E. Clinton Jansen *1290
Calculation of water-hammer pressures. By S. L. Berry. (let) 1144
Construction and use of empiric formulas. By Cyrus T. Brady, Jr. *163
Determining power possibilities on a watershed; Methods of constructing curves, requisite to the power determination. By Lyla A. Whitsit *496
Diagram for computing water-hammer pressure. By Frank H. Carter. *616
Experiments on uplift pressure in masonry dams. *202, (let) 371
Facts about percolation from canals. By W. C. Hammatt. (let) *881

HYDRAULICS: (Continued)
Hydraulic comparison of equivalent egg-shaped and circular sewers when flowing full. *252
Hydraulic laboratory for irrigation investigations, Fort Collins, Colo.; Irrigation investigations of the Office of Experiment Stations, U. S. Department of Agriculture and Colorado Experiment Station. By V. M. Cone *662
Manufacturer's hydraulic laboratory at the works of the Wheeler Condenser & Engineering Co. at Carteret, N. J. By P. A. Bancel. *916
Metal flumes for irrigation canals; Details of joints and supports *1077, (let) *1316
Neglected first principles of masonry dam design. *442, (lets) 623, 832
Origin and theory of the pitot tube. By John Airey. (let) 226
Paper on hydraulic engineering education; annual meeting of the Society for the Promotion of Engineering Education. 46
Problem of finding the proper turbine capacity to be installed at a water-power site. *462, (let) 674
Pulsograph, a new device for locating leaks in water mains. *515
Seepage losses from earth canals. *402, (let) *881
Suggested simplification for the value of C in Kutter's formula and a sewer discharge diagram. By Alfred Boyd. (let) *316
Test of pressure on wet concrete. By E. B. Germain. *294
Venturi meter co-efficients; Discussion of. 198, (lets) 200, (n) 674
Hygiene. (See under Sanitation.)
Hypochloride of lime. (See Water purification.)

I

ICE:
New shipping outfit for iced-water samples *819
Precipitation and runoff, Ishikari River, Japan, with special relation to ice conditions. By B. Okazaki. *850
Thrust on dams, Neglected first principles of masonry dam design. *442, (let) 623, 832
Illuminating Engineering Society, Historic gavel made for Pittsburgh convention (n) 574
Incinerators, Small municipal waste incinerators to be used at Glendale, Calif. (n) 1179
Indexes, Index to Vol. LXIX; date of mailing changed. (ed) 125
Industrial management. (See Labor; Shops and factories.)
Industrial organizations, De-centralizing great organizations (ed) 770
Injectors, Cooling a gas engine by internal injection; Hopkinson scheme of gas-engine cooling by injection water *594

INSPECTION:
Field for the inspector's efforts. By Arthur W. Tidd. 1030
Investigation of existing engineering structures. By Horace R. Thayer 609
Joint railway organization for the inspection of structural steel and steel rails. By A. W. Buel. (let) 86
Motor inspection and maintenance in industrial plants; Edison Electric Illuminating Co., Brooklyn, N. Y. By F. E. Hanchette *746
Need for proper inspection of sewer connections. By Norman M. Paul. (let) 832
Institute of Civil Engineers, New society house nearing completion. (n) 525
Institution of Mechanical Engineers, Benevolent fund, established. (n) 1185
Insulation; Peculiar explosion at Hebburn-on-Tyne, England, due to formation of inflammable gas by the destructive distillation of bituminous insulation on buried electric wires. (n) 553
Insurance, Co-operative insurance for employees arranged by the Fourth Ave. Ry. of New York City. (n) 645
Intakes. (See Water-works intakes.)
Internal combustion engines. (See Gas and oil engines.)
International Congress of Refrigeration, Third international congress, Chicago, Sept. 17-24, 1913. 679
International congresses, Should the United States participate in international congresses? (ed) 176

INTERNATIONAL ROAD CONGRESS:
Excursion to North Wales. By E. L. Corthell 215
Proceedings of third congress, London, England, June 23, 1913. 182
Should the United States participate in International congresses? (ed) 176

INTERNATIONAL ROAD CONGRESS: (Continued)
International Waterway Commission, International investigation of the pollution of boundary waters between the United States and Canada (ed) 669

INTERSTATE COMMERCE COMMISSION:
Difficult point in the Railway Valuation Law. (ed) 829
Engineer appointment requested by American Institute of Consulting Engineers (n) 1208
Express rates of country revised by Commission's decision of Aug. 4. (n) 277
Federal control of stock and bond issues (ed) 935
Five railway valuation districts announced (n) 807
Interstate railway valuation board of engineers makes no appointments as yet to subordinate positions; Tabulation of results of civil service examinations for engineering positions. (ns) 990, 1160, 1208, 1332
Investigation of rear collision of June 12 at Stamford, Conn., on the New York, New Haven & Hartford R. R.; Investigation of financial and other matters. (ed) 126
More revelations in "high finance"; Investigation of the St. Louis & San Francisco R. R. Co., by the Interstate Commerce Commission. (ed) 1091
Report on the derailment near Stockwell, Ind., on Jan. 7, 1913; Cleveland, Cincinnati, Chicago & St. Louis R. R. 1177, (ed) 1195
Report on railway-track scales. 322
Revision of express rates. (ed) 719
Spacing of distant signals. (ed) 176
State railway control in the United States. By H. Raynar Wilson. 1117, (ed) 1140

INVENTORS AND INVENTIONS:
Monument to the inventor of nitroglycerine (n) 1100
Oldfield patent bill cuts down from seventeen to three years the protection afforded to manufacturing patent owners. (n) 274
Protecting towns and cities from blackmailing patent litigation. By Daniel B. Luten. (ed) 617, (let) 883
Remarkable offer by the United States Government to owners of patents and copyrights. (ed) 934
Wrong way to aid the Panama-Pacific Exposition; Kahn law, recently enacted by Congress for the avowed purpose of inducing foreign owners of patented and copyrighted articles to make exhibits at San Francisco. (ed) 1311
(See also Patent law.)

INVESTMENTS:
Employment and investment combined: a warning. (ed) 985, (let) 1143
General advance in the interest rate on bond issues of all classes. (ed) 1091
Private irrigation project as an investment. By Thomas Berry. 854

IRON AND STEEL:
Coatings. (See Paints and painting.)
Corrosion:
Cause of "red water". (n) 1117
Corrosion of a long steel pipe line at Port Elizabeth, South Africa. (let) 273
Current features of public water-supplies; hygienic aspects; Rate of installation of filters; Water sterilization progress and limitations; Decolorization as an adjunct of water softening; Corrosion of metals 1062
Electrolytic corrosion of iron in soils; Paper at annual convention of the American Institute of Electrical Engineers. 78
Influence of copper in retarding the corrosion of steel plate. 232
Insulating wrappings for large water mains *1083
Prevention of the corrosion of iron water mains; Abstract of paper at the annual meeting of the American Public Health Association at Colorado Springs, September, 1913 570
Prevention of corrosion of iron in acid waters with an electrolytic method proposed by the United States Bureau of Mines. (n) 761
Tests of rate of corrosion of metal; Paper at annual meeting of the American Society for Testing Materials 74
How the Belgian iron industry maintains itself under international competition (ed) 717

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

IRON AND STEEL: (Continued)
Rail broken in fourteen places; Report recently issued by the engineer-physicist of the United States Bureau of Standards on a train derailment on the Louisville & Nashville R. R. near Hays Mills, Ala., Oct. 1, 1912.....*604
Tests, Uniform test bars for cast iron.....(n) 1011
Welding, Electric welding for track repairs and rail joints.....*295
Wrought iron, Report of committee; Annual meeting of the American Society for Testing Materials.... 37

IRRIGATION:
Australian water meter for irrigation supplies; Devised by J. S. Dethridge, of Melbourne.....*1283
Coöperation in irrigation work between state and federal governments .....(n) 115
Cost of irrigation works per acre supplied with water.....(lets) 128, 348, (n) 354, (ed) 987
"Dry farmers" plan waterway from source of Missouri River to Texas .....(n) 1244
Engineering principles applied to farm irrigation. By A. L. Harris.....*1172
Facts about percolation from canals. By W. C. Hammatt.....(let) *881
Government irrigation work; Extract from the annual report of the Secretary of the Interior to Congress. By Franklin K. Lane.....1322
Horse Shoe Bend Dam, Bassano, Alta., had its gates closed Oct. 20..(n) 892
Huntley project, Building charge on land fixed by Secretary of the Interior .....(n) 661
Hydraulic laboratory for irrigation investigations, Fort Collins, Colo.; Irrigation investigations of the Office of Experiment Stations, U. S. Department of Agriculture and Colorado Experiment Station. By V. M. Cone.....*662
Imperial Valley, Calif., Repairs to the Imperial Valley irrigation system, (n) 1021
Important Reclamation Service decision which establishes once for all the legality of the maintenance charge, (ed) 125
Independent opinion on the United States Irrigation Service....(ed) 987
Irrigation flume built by California Indians. By H. K. Palmer.....*553
Irrigation water-supply for the Pima Indians. By Arthur P. Davis....*956
Lining an irrigation ditch with Hess metallic fluming. By Elbert M. Chandler *464
Medina Valley project, Rapid construction of project in Texas; Construction of main dam; Contractor's plant and construction Methods. By Terrell Bartlett, *508 (Errat) 626
Metal flumes for irrigation canals; Details of joints and supports.*1077, (let) *1316
North Poudre Irrigation Co. tunnel completed Nov. 13.....(n) 1159
Private irrigation project as an investment. By Thomas Berry..... 854
Seepage losses from earth canals.*402, (let) *881
South San Joaquin irrigation project, California *748
Study of irrigation heads in the Modesto and Turlock irrigation districts, California..... 502
Sun River, Electric power to be used exclusively for construction work on the project.....(n) 1259

J

Japan, Precipitation and runoff, Ishikari River, Japan, with special relation to ice conditions. By B. Okazaki.*850
Jetties, Silting of harbors and effect of piers and jetties upon the movements of sand.....(n) 644
Junior Institution of Engineers, Making membership in an engineering society a tangible asset..(ed) 369, (lets) 524, 772, 774, 1042, 1315

K

Kansas City, Mo., Railway terminal system *237
Kelp, Kelp as a source of potash and as a fertilizer.....(n) 1171
Kilns, Tidewater Portland Cement Co., Baltimore, Md.; Categorical description of a modern cement and hydrated lime plant. By Richard K. Meade.....*858
Kingman, Dan C., Chief of Engineers; Biographical sketch of.....*834

L

PAGE

LABOR:
Camp Hill View sanitation, Catskill Aqueduct; General description; Sanitary conveniences; sanitary clauses of the contract; Carrying out of the sanitary measures. By Arthur W. Tidd.....*752
Chicago Technical League. By Louis A. Heyn .....(let) 1143
City day labor, Street cleaning without contractors; Day labor under the general charge of the Commissioners of the District of Columbia and under the direct charge of a civil engineer; Cost-keeping system; Municipal vs. contract-street cleaning; Washington, D. C.....681
Coöperative insurance for employees arranged by the Fourth Ave. Ry. of New York City.....(n) 645
Criminal prosecution of careless railway employees in Great Britain. By H. Raynar Wilson..(ed) 877, 886
Dismissing factory employees daily by ringing the fire bell.....(n) 461
Eight-hour day for workmen employed by contractors.....(n) 103
Employment of convicts on road work in New Jersey authorized by state legislature of 1913.....(n) 561
Filipino; Observations; Methods and manners of Eastern laborers; Harbor improvement at Iloilo, Philippine Islands. By Wilson T. Howe *1003
Foreign requirements governing work under compressed air. By Paul Seurot .....(let) 566
Industrial management; Paper at Leipzig meeting of American Society of Mechanical Engineers... 123
Influence of petty pay-roll economies on labor conditions. By T. N. Ashton .....(let) 567
Missouri occupational disease law. By W. J. Reiss.....(let) 425
Need of a new official in certain manufacturing plants. By H. C. Spaulding .....(let) 35
New law for railway arbitration.(ed) 175
New York law governing work under compressed air ..307, (lets) 425, 566
New York rules governing mine, tunnel and quarry work.....(ed) 563
Preventing accidents by recording dangerous conditions..... 943
Railway signal towermen to remain on duty not more than nine out of 24 hours.....(n) 90
Safety rules for handling construction materials .....(n) 365
Solving the problem of "human engineering".....962, (let) 1094
System of medical inspection for employees .....(ed) 173
Task system of constructing roads, Philippine Islands.....(n) *365
Unfairness of organized labor. By W. J. Knight.....(let) 672

LABORATORIES:
Concerning engineering research—the useless and the useful.(ed)32,(let) 129
French naval laboratory to be opened at Savranlivry, France.....(n) 1192
Hydraulic laboratory for irrigation investigations, Fort Collins, Colo.; Irrigation investigations of the Office of Experiment Stations, U. S. Department of Agriculture and Colorado Experiment Station. By V. M. Cone.....*662
Manufacturer's hydraulic laboratory at the works of the Wheeler Condenser & Engineering Co. at Carteret, N. J. By P. A. Bancel.....*916
Thermal testing plant at the Pennsylvania State College. By J. A. Moyer 695

LAMP POSTS:
Industrial city of Torrance, Calif.; General layout of the city and its various public improvements described. By Ralph Bennett.....*870
(See Street lighting.)

LAND RECLAMATION:
Louisiana, Drainage of lands of the lower Mississippi basin which are naturally available for agriculture. By A. M. Shaw.....*300
Report on Florida Everglades by a board of engineers composed of Prof. Daniel W. Mead, of Chicago and the University of Wisconsin; Allen Hazen, of New York, and Leonard Metcalf, of Boston, Mass. 835
Landscape architecture at Panama..(n) 539
Latrines, Simple latrine for the new smelter plant of the United Verde Copper Co. at Clarkdale, Ariz.(n) *823

LAW:
Authority to order municipalities to build destructors for domestic garbage .....(n) 595

PAGE

LAW: (Continued)
Control of municipal utility rates; Pennsylvania and Wisconsin. By R. S. H.....(ed) 467, (let) 673
Difficult point in the Railway Valuation Law.....(ed) 829
Drastic provisions of the San Diego, Calif., water-works ordinance.... 478
Engineers' Committee of the American Society of Civil Engineers to draft a federal water law.....(ed) 934
Engineers vs. lawyers or progress vs. precedent .....(n) 813
Excess condemnation to be voted on in New York State.....(ed) 768
Expert witness fees of engineers in Great Britain.....(n) 909
Illinois law for licensing mason contractors. 813
Maine public utility law to go into effect .....(n) 132
Marin municipal water-district, with headquarters at San Rafael, Calif., First water district to be formed under a new law in California.(n) 355
Missouri occupational disease law. By W. J. Reiss.....(let) 425
New law for railway arbitration..(ed) 175
New York law governing work under compressed air....307, (lets) 425, 566
New York rules governing mine, tunnel and quarry work.....(ed) 563
Pennsylvania public-service law..... 431
Regulations governing the use of a patented material on New York State road construction.....(n) 276
Roads, New Iowa road law. By A. Marston 131
Rules governing the submission of sewerage and water-supply plans to the New Jersey State Board of Health 548
Wisconsin water power law; All water-power developments under the control of the Railroad Commission.. 768

LEGAL DECISIONS:
Austin (Penn.); Indictment against George C. Bayliss, following Austin dam failure, dismissed Nov. 25.....(n) 1208
Austin (Penn.) dam failure; End of criminal prosecutions which followed .....(n) 1260
City of Denver and Denver Union Water Co. decision.....(ed) 177
Claims to be settled against Husted Milling Co., Buffalo, N. Y., following dust explosion.....(n) 1331
Collection of patent royalties from towns and cities. By Daniel B. Luten .....(let) 883
Decision on going value of the property of a public-service corporation, (n) 235
Decision on subway construction damages, Paris, France.....(n) 675
Important Reclamation Service decision which establishes once for all the legality of the maintenance charge, (ed) 125
Negative-head or down-draft water-filter patents upheld by the United States Circuit Court; New York Continental Jewell Filtration Co. against the city of Harrisburg, Penn. .....(n) 528
Patent infringement suit of Cameron Septic Tank Co. vs. Monmouth, Ill. dismissed Nov. 11.....(n) 1159
Settlement of flood loss between city of Black River Falls, Wis., and La Crosse Water Power Co.....(n) 1304
Validity of Luten patents on concrete bridge construction to be tested in Federal Court of Des Moines, Iowa .....(n) 574
Warren patents on bitulithic paving, 155, (let) 1145
Legal discussions, England, Prosecution of engine runners passing danger signals .....(ed) 877, 886

LEVEE CONSTRUCTION:
Building a levee across an old sawdust bed.....*169
Cairo, Ill., Floods and levees at one of the most vulnerable points from a flood standpoint in the Mississippi Valley.....*104
California, Large clam-shell dredges; levee building methods and standards in California. By Fred H. Tibbetts *456
Dry weather levee failures.....(ed) 1037
Electric hydraulic dredge; East Side Levee and Drainage District; Levee system, East St. Louis, Ill.*432
Flood protection for Lima, Ohio; Report on protective work against inundation by the Ottawa River, made by the W. J. Sherman Co., Consulting Engineers, of Toledo, Ohio 828
Report on flood protection for Troy, Ohio, by the Morgan Engineering Co. *1292

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

LEVEE CONSTRUCTION: (Continued)
Sloughing off of the Mississippi levee at Helena, Ar.....*1014, (ed) 1037
Templates for embankment slopes. By M. D. Ewell *821

LEVELS AND LEVELING:
Accurate method of leveling with a Wye level.....(erratum) 131
Precise leveling in New York City; Organization and methods of the work; Method of computation, of reciprocal leveling for river crossings, and the whole procedure in both field and office operations. By Frederic W. Koop..*446, (ed) 468
What is a leveler, and why?....*1129, (ed) 1141, (let) 1252
Life-boats, Loss of the "Volturno" and lifeboat equipment of ships..(ed), 769, (n) 780
Lightning, Effect of a lightning discharge upon a brick chimney.... *73
Lima, Ohio, Flood protection; Report on protective work against inundation by the Ottawa River, made by the W. J. Sherman Co., Consulting Engineers, of Toledo, Ohio..... 828

LIME:
Quick lime for thawing frozen ground, (n) 364
Report of committee; American Society for Testing Materials... 39
Tidewater Portland Cement Co., Baltimore, Md.; Categorical description of a modern cement and hydrated lime plant. By Richard K. Meade *858
Use of hydraulic lime for a masonry dam; Mexican Northern Power Co., Chihuahua, Mex. By Guy S. Newkirk 19
Lincoln, Abraham, Scheme to make federal memorial to; Lincoln Highway Association to build an Atlantic-Pacific highway.....(ed) 519
Lock-gates, Mississippi lock at Keokuk, Iowa; to enable river traffic to pass the dam; Single lift of 30 to 40 ft., and gate equipment....*964
Locomotive boilers. (See Boilers.)

LOCOMOTIVES:
Atchison, Topeka & Santa Fé Ry., Special features of new locomotives *279
Baldwin Locomotive Works, Locomotive No. 40,000 completed for use on the Pennsylvania R. R.....(n) 743
Delaware, Lackawanna & Western R. R. standard specifications, Mikado type, loading 2-E-60; new Summit cutoff west of Scranton, Penn....*410
Diesel engine, First locomotive to be built; General principle of operation of Diesel oil-engine locomotive .....*656, (ed) 670
Electric:
Maintenance of electric railway equipment. By C. H. Quereau.... 28
New 110-ton electric locomotive for New York City Zone of New York Central & Hudson River R. R..(n) 946
Thirty-ton electric mining locomotive; Baldwin-Westinghouse "bar-steel" type; Carnegie Coal Co., Charlerol, Penn. *869
Equivalent uniform loads on bridges for different types of engine.....*824
First full-sized locomotive propelled by oil engines.....(ed) 670
Gasoline, Gasoline motor freight and switching locomotive; Minneapolis & Northern Ry.....*745
Heat-treated steel and alloy steel in locomotive construction; Committee report, American Master Mechanics Association 30
Heavy industrial locomotive for use on the 36-in. gage tracks at the Ensley steel works of the Tennessee Coal, Iron and Railroad Co., (ns) 452, 655
Java State Rys., Tank locomotives of the 2:12:2 class built for....(n) 675
Locomotive with water-tube boiler tried by Prussian State Railways..(n) 80
Pennsylvania R. R., Hoisting locomotive out of the Mad River after 4½ months' submergence....(n) *613
Railway curve formulas; Formula for swing of locomotive truck. By Kenneth McIntosh.....(let) 673
Rules for laying up idle equipment... 820
Steel tires, Report of Interstate Commerce Commission on the derailment near Stockwell, Ind., on Jan. 7, 1913; Cleveland, Cincinnati, Chicago & St. Louis R. R., 1177, (ed) 1195
Superheaters to be applied to locomotives of the New York, New Haven & Hartford R. R.....(n) 234
Tests of oil-burning locomotives to be made by Indian government on North-Western State Ry.....(n) 409
Vanadian steel in locomotive construction. By George L. Norris..... 634
Wheels, High railway speeds and wheel failures .....1177, (ed) 1195

PAGE

LONDON, ENGLAND:
Motor omnibus accidents. By H. Raynar Wilson..... 550
Three years' record in motor-omnibus development 1180
Los Angeles, Calif.; Completion, testing and dedication of the Los Angeles Aqueduct By Burt A. Heinly.....*920

LUMBER:
Forest products in 1912; United States Bureau of Census.....(n) 495
Lower prices promised for lumber.... 891
Lumber statistics for 1911; United States Bureau of the Census..(n) 387

M

Magnetism, Conclusions from tests on the influence of vibration on magnetic properties.....(n) 635
Magnets, Locomotive crane with an electro-magnet lift.....(n) 1185
Mail transfer railways, Experimental electric carrier railway plant at Paterson, N. J.; for rapid transfer of mail and express. System of American Pneumatic Service Co. and Cambridge demonstration plant *637, *702
Maine Society of Civil Engineers, Code of ethics and recommended schedule of compensation of.....1231

MANUFACTURING INDUSTRIES:
American Locomotive Co. abandons the manufacture of automobiles..(n) 434
Annual capacity and the capitalization of automobile manufactories, Detroit, Mich.....(n) 869
Automobile exports in fiscal year 1913 .....(n) 309
British Columbia, Production of building materials in 1912.....(n) 465
Canada, Progress of the Canadian steel industry .....(n) 925
Diesel engine manufacture in the United States.....(ed) 1139
Forest products in 1912; United States Bureau of the Census.....(n) 495
Germany, Foreign trade in structural steel .....(n) 915
Growth of exports of machinery in 1912 .....(n) 80
How the Belgian iron industry maintains itself under international competition .....(ed) 717
Increase in the exports of manufacturers of the United States in 1913 .....(n) 1227
Lumber statistics for 1911; United States Bureau of the Census..(n) 387
Manufactures the chief feature in growth of export trade of the United States during the last ten years .....(n) 283
Need of a new official in certain manufacturing plants. By H. C. Spaulding .....(let) 35
Stone production in the United States in 1912.....(n) 562
Wrong way to aid the Panama-Pacific Exposition; Kahn law, recently enacted by Congress for the avowed purpose of inducing foreign owners of patented and copyrighted articles to make exhibits at San Francisco ....(ed) 1311

MANURE:
Effect of stable refuse on concrete. By Benjamin Brooks.....(let) *317
Stable manure collection and disposal at Columbus, O., in 1912....(n) 525

MAPS:
United States Geological Survey topographic maps for the civil and mining engineer. By E. G. Woodruff 384
Weighing the plot as a means of measuring land areas.....(n) 172
Marble, Artificial marble made with white portland cement.....(n) 1260
Marine engineering, Annual meeting of the Society of Naval Architects and Marine Engineers, New York City, Dec. 11-12..... 1255

MARINE ENGINES:
Diesel engines:
Diesel oil engine ship "Wotan" largest single-screw oil motor ship yet built.....(n) 833
Performance of the oil-engine ocean vessel "Christian X" of the Hamburg-American Line..... 347
Ship "Hagen" at New York.....(n) 29
Gas, Inland navigation barges with producer-gas engines; Alabama & New Orleans Transportation Co. to operate between the coal fields of Alabama and the city of New Orleans *1109

PAGE

Marine railways; Boat ways of reinforced-concrete, Rockhaven Harbor, N. D., for Missouri River Fleet of United States Engineer Corps. By S. R. Morrow.....*643
Masons, Illinois law for licensing mason contractors 813

MATHEMATICS:
Construction and use of empiric formulas. By Cyrus T. Brady, Jr....*163
Method of getting fifth root on an ordinary slide-rule.....(n) 1309
Teaching mathematics to engineering students; Suggestions as to the teaching of pure mathematics. By Willis Whited..... 538
Mechanical drawing. (See Drawing and drawings.)

MECHANICS:
Clearness in teaching mechanics..(ed) 421
Recommendations concerning the units of force. By Edward V. Huntington 400 .....(ed) 421
(See also Stresses.)
Medical inspection, System of medical inspection for employees.....(ed) 175
Metal, Tests of rate of corrosion of metal; Paper at annual meeting of the American Society for Testing Materials..... 75

METALLURGY:
Gathmann method of producing sound steel ingots.....*687
Work in nonferrous metals at the Bureau of Standards; Extracts from a paper by Dr. G. K. Burgess, Chief of the Division of Metallurgy, Bureau of Standards, before the American Institute of Metals 805

MEXICO:
All officers in the Mexican Army trained in the Mexican Military College at Chapultepec..(erratum) 626
American engineers in peril; New York "Times", Aug. 14.....(n) 386
War-time railroading..... 929
Milk, Sterilization, Discovery by chemists in the Department of Agriculture .....(ed) 421
Mineral production of the Union of South Africa for June, 1913..(n) 562
Mine rescue work, Motor vehicle for relief work at mines.....*1079

MINES AND MINING:
Acid-proof mine pump.....(n) 1017
Coal mining, Hammersmith (London) Borough Council to invite bids on pumping a mixture of coal and water for new electric power station .....(n) 303
Comments by Secretary Lane on conservation; Annual report of the Secretary of the Interior....(ed) 1312
Electric mining locomotive; Baldwin-Westinghouse "bar-steel" type; Carnegie Coal Co., Charlerol, Penn.*869
Natural asphalt deposits of California 937
New York rules governing mine, tunnel and quarry work.....(ed) 563
Phosphate resources of the United States .....(n) 107
Rules for misfires in blasting..1227, (ed) 1245
Selection of explosives for engineering work; Comparative energies of commercial explosives..... 495
Simple latrine for the new smelter plant of the United Verde Copper Co. at Clarkdale, Ariz.....(n) *823
South Africa; Mineral production of, for June, 1913.....(n) 562
United States Geological Survey topographic maps for the civil and mining engineer. By E. G. Woodruff 384
Mississippi River. (See Rivers.)
Mitering device, Adjustment of the devices at hinge, miter ends and sills of Panama Canal lock gates to prevent leakage.....*744
Models, Models in engineering design. By William M. Torrance.....(let) *1249
Monument to the inventor of nitroglycerine .....(n) 1100

MORTAR:
Action of various substances on cement mortars. By Richard K. Meade.. 21
Mexican Northern Power Co., Chihuahua, Mex.; Use of hydraulic lime for a masonry dam. By Guy S. Newkirk..... 19
Retempered mortar as a finishing coat for concrete surfaces. By Albert A. Northrop.....(lets) 178, 274
(See also Concrete.)

MOTOR VEHICLES:
American Locomotive Co. abandons manufacture of automobiles..(n) 434
Annual capacity and the capitalization of automobile manufactories, Detroit, Mich.....(n) 869

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

MOTOR VEHICLES: (Continued)
Automobile exports in fiscal year 1913, (n) 309
Cost of operation of 5-ton motor trucks .....(n) 338
Early use of Ogle's steam carriage; Letter by John Louden M'Adam, the roadbuilder..... 118
Gasoline motor trucks in a railway repair shop; Nippes, Germany..(n) 614
Motor-omnibus accidents in London, England. By H. Raynar Wilson.. 550
Motor-omnibus development in London 1180
Motor-omnibus operation; Motor-omnibus as a competitor of the electric street railway; Report by Harry P. Nichols, Chief of the Bureau of Franchises, and John A. McCollum. By Pendleton Dudley..(ed), 1039, 1050, 1087, (let) 1321
Motor vehicle for relief work at mines *1079
Pittsburgh Auto Transit Co., Pittsburgh, Penn.; 34-passenger single-deck motor omnibus..... *1
Tests of automobile pumping engines under the direction of the Committee on Exhibits, International Association of Fire Engineers, New York City.....(n) 659
Trackless-trolley motor for assisting haulage on a steep-grade street. By J. P. Schroeter.....*253
Truck driven from Valdez to Fairbanks, Alaska.....(n) 732
Wire wheels for automobiles likely to supersede wooden wheels.....(n) 253

MUNICIPAL GOVERNMENT:
Berlin, "Verband Gross-Berlin", a new form of metropolitan government 310
City manager plan:
Clarinda, Iowa..... 801
Comment on.....(ed) 313
Little Falls, Minn., and considered by Youngstown, Elyria, and Dayton, O.....(n) 387
Springfield, Ohio, adopted Aug. 26 (n) 635
Clarinda, Iowa, City manager plan adopted 801
Cleveland, Ohio, Arbitration of differences between city and Cleveland Ry. Co. completed and report presented .....(n) 262
Collection of patent royalties from towns and cities. By Daniel B. Luten .....(let) 883
Commission plan:
Adopted at Springfield, Ohio, Aug. 26 .....(n) 635
Commission government for Pennsylvania cities of the third class. (n) 484
Defeated at Minneapolis, Minn., Oct. 1 .....(n) 733
Control of sidewalk construction and maintenance 778
"Districting" cities in America; Minneapolis the first to adopt the plan .....(n) 1229
Engineers for the New York Public Service Commissions and as heads of New York City Departments..1045
Examinations as a means of determining the fitness of candidates for executive offices in the municipal service, discussed and vigorously advocated at the recent Boston meeting of the National Civil Service Reform League.....(ed) 1245
Los Angeles, Calif., Aqueduct and municipal debt problem....(ed) 32
Minneapolis, Minn., Commission plan defeated Oct. 1.....(n) 733
Nebraska cities of 5000 population may frame charities.....(n) 73
Operations of the garbage-reduction plant, Columbus, Ohio, 1912..... 562
Pennsylvania, Commission government for cities of the third class..(n) 484
Popularly-elected and self-appointed municipal experts.....(ed) 368
Progress in the city-manager movement: National Short Ballot Organization .....(n) 157
Protecting towns and cities from blackmailing patent litigation. By Daniel B. Luten..(ed) 617, (let) 883
Provincial public works organization of the Philippine Islands and its engineering personnel. By E. J. Westerhouse *958
Relations of consulting and municipal engineers in Great Britain. By H. C. H. Shenton..... 206
Seven principles for increasing the efficiency of municipal officials. By H. S. Gilbertson.....(let) 774
Short-term garbage-reduction contracts and municipal ownership....(ed) 31
Springfield, Ohio, City-Manger plan adopted .....(n) 635
Suburban metropolitan district in Philadelphia created by act of the Pennsylvania legislature.....(n) 257
Youngstown, O., City manager plan rejected .....(n) 435

PAGE

MUNICIPAL IMPROVEMENTS:
American Society of Municipal Improvements, twentieth annual convention, Wilmington, Del., Oct. 7-10 776
Excess condemnation to be voted on in New York State.....(ed) 768
General advance in the interest rate on bond issues of all classes..(ed) 1091
How to build and improve seaside resorts. By John S. Brodie..... 245
Industrial city of Torrance, Calif.; general layout of the city and its various public improvements described. By Ralph Bennett.....*870
Some general principles applicable to public construction contracts.... 1017
What is a proper allowance for depreciation in a sewerage system? .....(ed) 1093

MUNICIPAL OWNERSHIP:
Chicago, Ill.:
Cost of municipal electric lighting.. 668
Purchase of the plant of the Chicago Reduction Co. authorized.....(n) 357
Denver, Colo., water-supply controversy, Decision of U. S. Supreme Court .....(ed) 177
Further step toward municipal ownership of water-works taken..(n) 1331
Los Angeles Aqueduct and municipal debt problem.....(ed) 32
Purchase by city of plant of the Des Moines Water Co. tentatively agreed on.....(n) 484
San Francisco, Calif.:
Municipal street-railway lines to furnish transportation for the Panama-Pacific Canal Exposition..(n) 484
Net profit of the municipal railway for six months to July 31, 1913, (n) 484
Short-term garbage-reduction contracts and municipal ownership....(ed) 31
State regulation of utilities under municipal ownership.....(let) 673
Toronto, Ont., City ownership of street railway and electric lighting systems under consideration.....(n) 90

N

Naphtha, Storing and handling inflammable liquids; Martini & Huneke safety system for.....*1011
NATIONAL CONSERVATION CONGRESS:
Annual congress, Washington, D. C. By Clarence T. Johnson..(ed), 1092, 1106 (let) 1199
National or state control of the gifts of nature.....(ed) 1092, 1106, (lets) 1199 1316
National debts, Age of extravagance..(n) 1175
National Civil Service Reform League, Examinations as a means of determining the fitness of candidates for executive offices in the municipal service, discussed and vigorously advocated at the recent Boston meeting.....(ed) 1245
National Municipal League, Seven principles for increasing the efficiency of municipal officials. By H. S. Gilbertson .....(let) 774
National Paving Brick Manufacturers' Association, Annual meeting, Cleveland, Ohio, Sept. 17..... 633
NAVAL ARCHITECTURE:
Abstract of the report of the Committee on Hulls and Bulkheads, Department of Commerce....(n) 834
Annual meeting of the Society of Naval Architects and Marine Engineers, New York City, Dec. 11-12.....1255
Injury to the hull of the U. S. S. "Arkansas" by grounding.....*439
Recent disasters to lake shipping..(ed) 1141
NAVIGATION:
Inland navigation barges with producer-gas engines: Alabama & New Orleans Transportation Co. to operate between the coal fields of Alabama and the city of New Orleans *1109
Safety at sea, object of committee of experts appointed by Department of Commerce.....(n) 574
(See also Ships.)
New England Water Works Association, Annual convention: Philadelphia, Penn., Sept. 10-12..... 567
NEWSPAPERS:
Discovery by chemists in the Department of Agriculture .....(ed) 421
Flood prevention by means of beavers, (n) 86
NEW YORK CITY:
Advance of structural methods illustrated by the Standard Oil Co.(n) 946
Competitive plans invited for a seaside park for Borough of Queens, (n) 733

PAGE

NEW YORK CITY: (Continued)
Educational trips by engineers in a city department; Borough of Manhattan .....(n) 90
Engineers for the New York Public Service Commissions and as heads of New York City Departments..1045
Figures of amount of business of the port of New York and other cities, for fiscal year ended June 30, 1913 .....(n) 234
Handling west-bound freight on the North River railroad piers. By W. J. Barney.....*309
Heaviest concentrated rainfall ever recorded occurred July 28....(n) 277
Heavy rainfall of Sept. 5.....(n) 528
Hydraulic comparison of equivalent egg-shaped and circular sewers when flowing full.....*252
Most severe of three record rainfalls, Oct. 1 .....(n) 781 *887
New garbage disposal contract; contractor agrees to pay the city for garbage delivered to certain points of deposit on waterfront....267, (ed) 269
New York City at the opening of the nineteenth century. By M. H. Doughty .....(let) 622
New York Sewer Plan Commission to develop plan for sewage disposal, (n) 132
Precise leveling in New York City; Organization and methods of the work. Method of computation of reciprocal leveling for river crossings, and the whole procedure in both field and office operations. By Frederick W. Koop.*446, (ed) 468
Remarkable rainfall of Oct. 1, 1913...*887
Smoking on street cars prohibited by Public Service Commission....(n) 386
Summary of traffic on the city subway and the Manhattan and Bronx elevated railroads .....(n) 865
Typhoid fever deaths in second quarter of 1913 .....(n) 343

NEW YORK STATE:
Engineers for the New York Public Service Commissions and as heads of New York City Departments..1045
Examination questions for New York State engineering positions.*1129, (ed) 1141
Excess condemnation to be voted on in New York State.....(ed) 768
Investigation of highway work..(ed) 1142
Prospects of state highway administration .....(ed) 829
Road organization; Complete reorganization of the New York State Highway Department recommended by the Board of Consulting Engineers 982
Specifications for State highway work.1203
Types of New York State roads; Classes of pavements adapted to different kinds of traffic requirements; Cost data; Conclusions based on several years' experience. By W. G. Harger.....*1148
Nickel, Welding nickel practiced in shops using nickel sheets as raw material .....(n) 616
Nitrates, Utilizing water to produce nitrates for fertilization.....(n) 1052
Nitroglycerine, Monument to the inventor of.....(n) 1100

O

Ocean, Tropical seas, Neglected source of power in nature; Scheme to utilize difference in temperature at various depths....250, (ed) 270 (let) 425
OILS:
French tests on oil-mixed concrete; Effect of mixing a heavy mineral oil with concrete; Ponts et Chaussees Laboratory at Boulogne-sur-mer 1228
Storing and handling inflammable liquids; Martini & Huneke safety system for.....*1011
Oil fuel, Distillation of oil from bituminous shales .....(n) 479
Omnibuses, Future of the motor omnibus. By Pendleton Dudley..(ed) 1039, 1087, 1050, (let) 1321
Oregon Society of Engineers, Employment department organized by Oregon Society of Engineers.....(n) 905
Oxygen for enriching the air supplied to iron blast furnaces to be tried by the Ougree-Marihaye Co. of Belgium .....(n) 560
Oysters and other shell-fish; Committee reports on sewerage and sewage disposal and on river cleaning; American Public Health Association 759
Ozone, Recent investigations of the bactericidal, deodorizing and physiologic action of ozone. By W. H. Thompson..(ed) 1092, 1096, (let) 1319

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

P PAGE

PAINTS AND PAINTING:
Baking the paint upon passenger cars in order to dry it quickly.....(n) 943
Car washing against paint preservation .....(n) 466
Report of committee; Annual meeting of the American Society for Testing Materials.....39, 76

PANAMA-PACIFIC INTERNATIONAL EXPOSITION OF 1915:
Construction work, site, planning, decoration and architectural and engineering design of the buildings. By A. H. Markwart.....*895
Electric light and power; gas, steam and compressed air; sewers and sanitary equipment; High-pressure fire-protection water system; fire protection; roads and pavements. By A. H. Markwart.....*1070
Parcel-post. Reforms needed in parcel-post administration.....(ed) 770

PARKS AND PLAYGROUNDS:
Hetch Hetchy National Park:
San Francisco water-supply bill approved Sept. 3.....(n) 733
San Francisco wins its long fight, (ed) 1312
Hetch Hetchy water supply bill passed United States Senate on Dec. 6, (n) 1259
New York City, Competitive plans invited for a seaside park for Borough of Queens.....(n) 733
Road funds from the national forests .....(n) 801

PATENT LAW:
"Bitulithic" pavement claims and asphaltic concrete as a paving material for residence streets.....155, (let) 1145
Collection of patent royalties from towns and cities. By Daniel B. Luten.....(let) 883
Negative-head or down-draft water-filter patents upheld by the United States Circuit Court; New York Continental Jewell Filtration Co. against the city of Harrisburg, Penn.....(n) 528
Oldfield patent bill cuts down from seventeen to three years the protection afforded to manufacturing patent owners.....(n) 274
Patent infringement suit of Cameron Septic Tank Co. vs. Monmouth, Ill., dismissed Nov. 11.....(n) 1159
Protecting towns and cities from blackmailing patent litigation. By Daniel B. Luten...(ed) 617, (let) 883
Remarkable offer by the United States Government to owners of patents and copyrights.....(ed) 934
Validity of Luten patents on concrete bridge construction to be tested in Federal Court of Des Moines, Iowa .....(n) 574
Warren patents on bitulithic paving, 155, (let) 1145
Wrong way to aid the Panama-Pacific Exposition: Kahn law, recently enacted by Congress for the avowed purpose of inducing foreign owners of patented and copyrighted articles to make exhibits at San Francisco.....(ed) 1311

PAVEMENTS:
Annual convention of the American Road Builders' Association, Philadelphia, Penn., Dec. 9-12.....1256
Asphalt:
Asphalt pavement repairs on new plan in Philadelphia.....(n) 256
Asphaltic concrete as a paving material for residence streets...155, (let) 1145
Increasing production of asphalt from petroleum.....(n) 293
Making asphalt pavements non-slippery at San Francisco, Calif. (n) 1032
Portable asphalt mixing plant; Springfield, Mass.....*420
Asphalt block, Creeping of an asphalt-block pavement. By C. S. Rindsfoos .....(let) *1315
Bitulithic, Warren patents on bitulithic paving.....155, (let) 1145
Bituminous macadam:
Asphaltic concrete as a paving material for residence streets.....155, (let) 1145
Causes of wear and deterioration of roadways. By Laurence J. Hewes 587
Crown suitable for bituminous macadam pavements.....(lets) 773, 936
Portable asphalt mixing plant, Springfield, Mass.....*420
Recent improvements in macadam road machinery. By A. W. Dean. 603
Regulations governing the use of a patented material on New York State road construction.....(n) 276

PAVEMENTS: Bituminous macadam: (Continued) PAGE
Warren patents on bitulithic paving, 155, (let) 1145
Brick:
Causes of wear and deterioration of roadways. By Laurence J. Hewes. 587
Country roads built during the past five years in the territory surrounding Cleveland, Ohio. By James M. McCleary.....749, (ed) 933
Methods of paving street railway tracks; Brick paving with asphalt flangeways at Tulsa, Okla.; Concrete paving at Texarkana, Tex.-Ark *1229
National Paving Brick Manufacturers' Association, Annual meeting, Cleveland, Ohio, Sept. 17..... 633
Pavement left intact over washout; Dunham Road at Tinker's Creek, Cuyahoga County, Ohio.....*895
Relative merits of different kinds of slag .....(n) 131
Brooklyn, N. Y., Creeping of an asphalt-block pavement. By C. S. Rindsfoos.....(let) *1315
Chicago, Ill.:
Asphaltic concrete as a paving material for residence streets...155, (let) 1145
Repair and maintenance of various kinds of pavement.....1137
Concrete:
Are horses' feet harmed by concrete paving?.....(n) 1056
Causes of wear and deterioration of roadways. By Laurence J. Hewes 587
Common sense concerning concrete road paving.....(ed) 125
Concrete road construction: Paper presented before the Permanent International Association of Road Congresses, London, 1913. By A. N. Johnson..... 627
Conference on concrete road building to be held in Chicago, Ill..(n) 219
Kansas City, Mo., Plain concrete paving; Construction of pavements and comments upon their wear and utility. By Clark R. Mandigo.....*112, (ed) 125
Methods of paving street railway tracks; Brick paving with asphalt flangeways at Tulsa, Okla.; concrete paving at Texarkana, Tex.-Ark. *1229
Roads of Wayne County, Mich.: Paper before American Road Congress. By Frank H. Rogers..... 730
Crown, Crown suitable for bituminous macadam pavements...(lets) 773, (n) 936
Effect of heavy motor traffic on cost of road maintenance..... 630
Excessive street widths..*1134, (ed) 1139
Granite block, Oak-keyed Belgian block pavement.....*602, (let) 721
Horseshoe that will minimize road damage .....(n) 157
Industrial city of Torrance, Calif.; General layout of the city and its various public improvements described. By Ralph Bennett.....*870
Kansas City, Mo., Plain concrete paving; Construction of pavements and comments upon their wear and utility. By Clark R. Mandigo, *112, (ed) 125
Long-term guarantees on State highway contracts in New York. By F. R. Upton...(ed) 1196, (let) 1316
Longview, Tex., Heaving of wood-block pavement under extreme climatic conditions, Longview, Tex., by H. N. Roberts and P. E. Green. By C. S. Rindsfoos.....*1134, (ed), 1139, (let) *1315
Macadam:
Causes of wear and deterioration of roadways. By Laurence J. Hewes 587
Crown suitable for bituminous macadam pavements..(lets) 773, (n) 936
Early, Letter by John Louden M'Adam, the roadbuilder..... 118
Instructions for foremen and contractors on state road construction in Wisconsin..... 291
Recent improvements in macadam road machinery. By A. W. Dean.. 603
Treatment of worn out and raveled macadam road surfaces; Paper before American Road Congress. By E. A. Stevens..... 728
Maintenance, Repair and maintenance of various kinds of pavement.....1137
Methods of paving street railway tracks; Brick paving with asphalt flangeways at Tulsa, Okla.; Concrete paving at Texarkana, Tex.-Ark *1229
Oak-keyed Belgian block pavement; invented by Edward Alcott..*602, (let) 721
Panama-Pacific International Exposition of 1915, at San Francisco, Calif.; Roads and pavements. By A. H. Markwart.....*1070

PAVEMENTS: (Continued) PAGE
Paper on highway engineering; Annual meeting of the Society for the Promotion of Engineering Education 46
Problem of economic road construction, (ed) 619
Proceedings of the Third International Road Congress, London, England, June 23, 1913..... 182
Protecting towns and cities from blackmailing patent litigation. By Daniel B. Luten..(ed) 617, (let) 893
San Francisco, Calif., Making asphalt pavements non-slippery.....(n) 1032
Standard specifications for, Abstract of paper before American Society of Municipal Improvements..... 776
Third annual American Road Congress, Detroit; Brief abstract of proceedings 726
Wood-block:
Early objection to wood-block pavements and an early argument for timber preservation 1076
Heaving of wood-block pavement under extreme climatic conditions, Longview, Tex., by H. N. Roberts and P. E. Green. By C. S. Rindsfoos ...*1134, (ed) 1139, (let) *1315

PENNSYLVANIA:
Control of municipal utility rates. By R. S. H.....(ed) 467, (let 673
Defeat for state aid for municipal sewage-treatment works.....(ed) 467
Vote on a $50,000,000 bond issue for good roads.....(ed) 986
Pens; Fountain drawing pens....(ns) 614, 823
Penstocks, Puntledge River power development, Vancouver, B. C.; Novel features in flume and penstock design. By F. M. Kirsch, *793, (ed) 829, (let) 1094
Percolation, Facts about percolation from canals. By W. C. Hammatt. (let) *881

PETROLEUM:
Distillation of oil from bituminous shales .....(n) 479
Increasing production of asphalt from petroleum .....(n) 293

PHILADELPHIA, PENN.:
Fire-prevention conference being arranged by Fire Prevention Commission of Philadelphia.....(n) 289
Plans of Pennsylvania R. R., Baltimore & Ohio R. R., the Belt Line R. R. and the city for terminal improvements .....(n) 251
Studies of river bottoms in relation to sewage disposal.....*918
Suburban metropolitan district created by act of the Pennsylvania legislature .....(n) 257

PHILIPPINE ISLANDS:
Flourishing forestry school in operation in the Philippine Islands.(n) 1062
Provincial public works organization and its engineering personnel. By E. J. Westerhouse.....*958
Reinforced-concrete wharf with grouted foundations; Harbor improvement at Iloilo, Philippine Islands. By Wilson T. Howe.....*1003
Task system of constructing roads, (n) *365
Phosphate resources of the United States, (n) 107

PHYSICS:
Conclusions from tests on the influence of vibration on magnetic properties .....(n) 635
Recommendations concerning the units of force. By Edward V. Huntington .....400, (ed) 421
Theory of the penetration of heat in solid materials. By L. R. Ingersoll 866

PIERS:
Bridge pier collapsed, Lafayette, Ind., June 26.....(n) 132
Pont Notre-Dame reconstruction, Paris, France; Arch replacement under traffic 1211
Self-draining foundation pit on the bank of a river; Excavation of piers at the Oregon-Washington R. R. & Navigation Co.'s viaduct across the Spokane River, Spokane, Wash. By John W. Cunningham.*1024
Piledrivers, Early piledrivers; Some sketches from models and old drawings in the great German technological museum at Munich.*1026

PILES:
Concrete:
Interesting pile failure; Montgomery Dock No. 1, Portland, Ore. By John W. Cunningham.....*465
New type of.....(n) 373

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

PILES: (Continued)
Sheet piling:
Pier for the outer harbor at Chicago, Ill.; Indiana St. pier, 3000 ft. long and 292 ft. wide; alternative design for pier, with concrete sheet piling *552
Steel sheet piling with filler timber; H. M. Gould, Nashville, Tenn., inventor ..... (n) *613
Tests; Special concrete foundations in the Manila Port District. By John W. Graham *554
Pima Indians, Irrigation water-supply for. By Arthur P. Davis *956

PIPE:
Calculation of water-hammer pressures. By S. L. Berry ..... (let) 1144
Cast-iron:
Bending 10-in. cast-iron pipe, Preston, Cuba, water supply ..... (n) 173
Unusual features of a 48-in. cast-iron water main across a salt marsh to Atlantic City, N. J. By T. Chalkley Hatton *1046
Concrete:
Pressure tests of jointed concrete pipes. By Mason D. Pratt. *1126, (let) 1320
Reinforced-concrete high-pressure Y-pipe connection, 96x72x72-in.; Puntledge River power development, Vancouver, B. C. By F. M. Kirsch ... *793, (ed) 829, (let) 1094
Corrosion:
Cause of "red water" ..... (n) 1117
Corrosion of a long steel pipe line at Port Elizabeth, South Africa. (let) 273
Current features of public water-supplies; Hygienic aspects; Rate of installation of filters; Water sterilization progress and limitations; decolorization as an adjunct of water softening; corrosion of metals 1062
Prevention of the corrosion of iron water mains; Abstract of paper at the annual meeting of the American Public Health Association at Colorado Springs, September, 1913 570
Diagram for computing water-hammer pressure. By Frank H. Carter ... *616
Steel:
Corrosion of a long steel pipe line at Port Elizabeth, South Africa. (let) 273
Insulating wrappings for large water mains *1083
Suggested simplification for the value of C in Kutter's formula and a sewer discharge diagram. By Alfred Boyd ..... (let) *316
Tests, Pressure tests of jointed concrete pipes. By Mason D. Pratt, *1126, (let) 1320
Wood-stave:
Life of supports for large wood-stave pipe ..... *793, (ed) 829
Probably the largest wood-stave pipe yet built; Northwestern Electric Co., Portland, Ore *685
Puntledge River power development, Vancouver, B. C.; Novel features in flume and penstock design. By F. M. Kirsch ..... *793, (ed) 829, (let) 1094
Pipe-cleaning machines, Cleaning water mains at Hartford, Conn., by contract specifications for. By Caleb Mills Saville *1098

PIPE JOINTS:
Pressure tests of jointed concrete pipes. By Mason D. Pratt.. *1126, (let) 1320
Reinforced-concrete high-pressure Y-pipe connection, 96x72x72-in.; Puntledge River power development, Vancouver, B. C. By F. M. Kirsch .... *793, (ed) 829, (let) 1094

PIPE LINES:
Completion of the Los Angeles Aqueduct; Brief description of the work with some reference to the historical details and a concrete explanation of the plans of operation and the future economic importance ..... (lets) 318, 1095
Large reinforced-concrete culvert, Newcastle, Eng *339
Pipe line 250 miles long from West Virginia Gas Fields to Louisville, Ky ..... (n) 1113
Power plant designed as a house of cards; Pioneer Station of the Utah Light & Railway Co., Ogden, (ed) 985, (ns) 990, 1055
Probably the largest wood-stave pipe yet built; Northwestern Electric Co., Portland, Ore *685
Puntledge River power development, Vancouver, B. C.; Novel features in flume and penstock design. By F. M. Kirsch ..... *793, (ed) 829, (let) 1094

PAGE

PIPE LINES: (Continued)
Unusual features of a 48-in. cast-iron water main across a salt marsh to Atlantic City, N. J. By T. Chalkley Hatton *1046
Pitometers, Water-waste and pitometer surveys in Philadelphia. By John S. Ely ..... (ed) 669, *676
Pitot tube, Origin and theory of. By John Airey ..... (let) 226
Pittsburgh, Penn., in 1807 441

PLATE-GIRDERS:
Diagram for projecting edges of steel bearing-plates *1033
Hoisting heavy girders 250 ft. above the street; Consolidated Gas Co. building *275
Loading formulas for crane-girders, (ns) 815, 1036
Long girder span replacing a Howe truss put in place at the Bad River crossing of the Duluth, South Shore & Atlantic Ry., Nov. 16 ..... (n) *1260
Office building of the Consolidated Gas Co., New York City; Details of unusual features; Construction methods, etc *1275
Replacing a timber Howe truss with a long-span plate-girder; Bad River crossing, Duluth, South Shore & Atlantic Ry., near Shilo, Wis ... *1303
Shear and rivet diagram for railway plate-girders *823
Shifting the girders and columns of the Chicago Elevated Railway ... *906
Unusual girder work in the Sheridan Square Theater, Pittsburgh, Penn. 1230
Plows, Cable-operated plow for making drainage ditches in Louisiana swamps. By A. M. Shaw *300
Plumb-bob holder on the leg of a tripod, (n) *1035
Poetry, An optimistic view of the draftsman's job (including poem). By E. A. Van Deusen ..... (let) 85

POLES:
Condition of experimental telegraph poles, treated and untreated, after eight years' service. By C. H. Teesdale *1084
Preservative treatment of poles; Abstract of paper read at the annual convention of the National Electric Light Association. By Russell A. Griffin 61
Pontoons, New pontoon bridge over the Golden Horn. By F. C. Coleman *1018
Population statistics, New York City population 5,322,000 in April. (n) 252
Post-office, Reforms needed in parcel-post administration ..... (ed) 770
Potash, Kelp as a source of potash and as a fertilizer ..... (n) 1171
Power, Neglected source of power in nature; Utilizing differences in temperatures at various depths in tropical oceans.. 250, (ed) 207, let 425

POWER PLANTS:
Hydraulic:
Determining power possibilities on a watershed; Methods of constructing curves, requisite to the power determination. By Lyle A. Whitsit *496
Germany, State hydroelectric power system to be built in Prussia.. (n) 483
Keokuk, Iowa:
Mississippi River power plant dedicated Aug. 26 ..... (n) 435
Turbines of the Mississippi River Power Co *340
Turbine runners of the Mississippi River Power Co. By H. B. McDermid *342
Power plant designed as a house of cards; Pioneer Station of the Utah Light & Railway Co., Ogden ..... (ed) 985, (ns) 990, 1055
Puntledge River power development, Vancouver, B. C.; Novel features in flume and penstock design. By F. M. Kirsch. *793, (ed) 829, (let) 1094
Spaulding dam and South Yuba power development of the Pacific Gas & Electric Co. By H. C. Vensano *1163
Keokuk, Iowa, Mississippi lock; to enable river traffic to pass the dam; Single lift of 30 to 40 ft., and gate equipment *964
Panama-Pacific International Exposition of 1915, at San Francisco, Calif.; Electric light and power; Gas, steam and compressed air; Sewers and sanitary equipment; High-pressure fire-protection; Roads and pavements. By A. H. Markwart *1070
Pend d'Oreille River, Wash., Permit for power development granted International Power & Mfg. Co.. (n) 324
Power development in U. S. forest reserves being greatly increased. (n) 324

PAGE

POWER PLANTS: (Continued)
Producer gas, Producer gas plant a feature of plant of Barnhart Bros. & Spindler, Chicago, Ill ..... (n) 1260
Service equipment of the Samaritan Hospital, Troy, N. Y. By C. F. Herington *108
Shuman-Boys sun-power plant, Cairo, Egypt, to be tested ..... (n) 228
Solar power plant put in operation at Meadi, near Cairo, Egypt ..... (n) 865
Steam:
Chicago, Ill., Parsons steam-turbine generating-unit; 33,500-hp. British-built steam turbine of the Commonwealth Edison Co., Chicago, Ill ... *940
Philadelphia & Reading Ry. at St. Clair, Penn. By Joseph S. Ward. *540
Reconstruction of Mahanoy plane, Philadelphia & Reading Ry. By Joseph S. Ward ..... *1220, (ed) 1247
Steam-turbine generating units, 30,000-kw each to be built for Interborough Rapid Transit Co.. (n) 324
Solar power plant put in operation at Meadi, near Cairo, Egypt.. (n) 865
Sun River Irrigation Project, Electric power to be used exclusively for construction work on the project, (n) 1259
Swiss hydro-electric station using water under 2800-ft. head *52
Utilizing low-grade temperature drops as a source of power ..... (ed) 270
Wachusett dam, Profitable state hydro-electric power plant ..... (n) 297
Wisconsin water power law; All water-power developments under the control of the Railroad Commission.. 768
Power transmission: (See also Belts and belting; Gears and gearing; Rope drives.)
Power transmission, Electric. (See Electric power.)
Precipitation. (See Rainfall.)
Propellers, Visible scale for torsion power meters ..... (n) 1194

PUBLIC HEALTH:
Employment of engineers in the Federal Public Health Service.. (ed) 1245
Lessons from a never-used sewage-treatment plant ..... (ed) 423
Lessons from a probable water cress typhoid outbreak ..... (ed) 311, *322
Missouri occupational disease law. By W. J. Reiss ..... (let) 425
New school for health officers at Harvard ..... (ed) 421, 430
Ohio, 1913 flood subject of Board of Health bulletin ..... (n) 132
Pennsylvania, Second defeat for state aid for municipal sewage-treatment work ..... (ed) 467
Pennsylvania R. R. employees suffering from communicable diseases debarred from dining cars ..... (n) 115
Public-health exhibit train run through Michigan ..... (n) 162
Recent investigations of the bactericidal, deodorizing and physiologic action of ozone. By W. H. Thompson.. (ed) 1092, 1096, (n) 1310
Public improvements, Should fees be charged for the use of plans by contractors estimating on work? (ed) 831

PUBLIC LANDS:
Development of water power in the national forests 573
Excess condemnation to be voted on in New York State ..... (ed) 769
Federal power over public lands held supreme over state jurisdiction, (n) 1260
Good work by state conservation commission ..... (ed) 81
Hetch Hetchy controversy, San Francisco wins its long fight ..... (ed) 1312
Hetch Hetchy National Park, San Francisco water-supply bill approved Sept. 3 ..... (n) 733
Hetch Hetchy water-supply bill passed United States Senate on Dec. 6, (n) 1259
National or state control of the gifts of nature; National Conservation Congress. By Clarence T. Johnson. (ed) 1092, 1106, (lets) 1199, 1316
Road funds from the national forests, (n) 801

PUBLIC SERVICE COMMISSIONS:
Control of municipal utility rates; Pennsylvania and Wisconsin. By R. S. H ..... (ed) 467, (let) 673
Engineers as members of public service Commissions; a pertinent illustration ..... (ed) 126
Germany, "Verband Gross-Berlin", a new form of metropolitan government 310
Illinois, Public service commission to to be appointed by Governor E. F. Dunne ..... (n) 1290
Maine, Public utility law to go into effect ..... (n) 132

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

PUBLIC SERVICE COMMISSIONS: (Continued)
Massachusetts, Public service commission of five members supersedes old Massachusetts Railroad Commission .....(n) 244
New York State:
Block signal system ordered installed on the Whitestone Division of the Long Island R. R., by the Interstate Commerce Commission..(n) 1259
Engineers for the New York Public Service Commissions and as heads of New York City Departments..1045
King's County Gas Co. rate decision; True value of public-utility property as it affects public welfare, (ed) 367
Practical men appointed.....(ed) 126
Pennsylvania, Municipal contracts with public utility companies; Full control of rates by the Public Service Commission.....(n) 981

PUBLIC SERVICE CORPORATIONS:
Control of municipal utility rates; Pennsylvania and Wisconsin..(ed), 467, (let) 673
Decision on going value of the property of a public-service corporation .....(n) 235
Federal control of stock and bond issues .....(ed) 935
King's County Gas Co. rate decision; true value of public-utility property as it affects public welfare, (ed) 367
Life of physical railway property; Abstract of a report of the joint Committee on Life of Railway Physical Property of the American Electric Railway Engineering and Accountants' Associations... 972
Overcrowded street cars; Bill proposing that passengers having to stand pay half fare.....(n) 1181
Pennsylvania public-service law..... 431
State regulation of utilities under municipal ownership.....(let) 673
Uniform accounting systems for public utilities in New Jersey.....(n) 36
Wisconsin water power law; All water-power developments under the control of the Railroad Commission.. 768
Pulsograph, New device for locating leaks in water mains.....*515

PUMPS AND PUMPING:
Acid-proof mine pump.....(n) 1017
Auxiliary deep-well water-supply with electric pumps; Rockford, Ill....*346
Centrifugal pumps; Development of balancing devices for..*490, (let) *722
Design for low-service rotary vacuum and air-compressor pumps; Nash low-service air pump.....*1010
Excavating a bridge abutment through quicksand. By Frank I. Barrett.*608
Hammersmith (London) Borough Council to invite bids on pumping a mixture of coal and water for new electric power station....(n) 303
Hydraulic laboratory for irrigation investigations, Fort Collins, Colo.; Irrigation investigations of the Office of Experiment Stations, U. S. Department of Agriculture and Colorado Experiment Station. By V. M. Cone.....*662
Pumping out foundation pits.....(n) 174
Pump-valve seat which rotates its valve to produce uniform wear; Boyd turbine valve-seat.....*909
Rotary high-vacuum air pump; Thyssen design.....*1125
St. Lawrence River at Levis, Quebec; Dry-dock of record size, built by the Department of Public Works of the Dominion of Canada.....*1314
Submerged centrifugal pumps to be installed at Newark Bay pumping station; Three 100,000,000 gal. each .....(n) 90
Tests of automobile pumping engines under the direction of the Committee on Exhibits, International Association of Fire Engineers, New York City.....(n) 659
Tests of the direct-acting explosion pumps (Humphrey design) at Chingford, England.....(n) 1331
Turbine-driven pump for service where space is limited; 8000 r. p. m.(n) 1056
Vacuum pumps, Rotary air pump for high-vacuum condenser service...*507

Q

Quantity surveying, Desirability of establishing quantity surveying in the United States. By Leslie H. Allen.....(ed) 877, (let) 988

QUARRIES:
Breaking quarry stone with a cannon ball .....(n) *822
New York laws governing mine, tunnel and quarry work.....(ed) 563

PAGE

QUARRIES: (Continued)
Platform for dumping quarry cars....*612
Rules for misfires in blasting....1227, (ed) 1245
Selection of explosives for engineering work; Comparative energies of commercial explosives..... 495
Simple power scraper outfit used for earth stripping; Middlebury, Vt., (n) 1035
Sledge for breaking rock.....(n) 366
Stone production in the United States in 1912.....(n) 582
Quaywalls. (See Seawalls.)

QUICKSAND:
Excavating a bridge abutment through quicksand. By Frank I. Barrett..*608
Sewer construction in quicksand; West Liberty, Iowa.....1027

R

Rack railways, Transandean Railway from Arica, Chile, to La Paz, Bolivia; 459-km. (144-mi.) meter-gage railway with a 24-mi. rack section, 11,800 ft. above sea level. By G. H. Sawyer.....*1059
Radium, Largest shipment of radium from United States to France, Nov. 22.....(n) 1133
Radius of gyration, Short cut to the least radius of gyration..... 360
Rail-grinding machines, Electric rail-grinding machine.....*1181
Rail-handling machine, Rail-handling machine for rail renewals.....*1032

RAIL JOINTS:
Austrian rail joint of the wedge type, manufactured by Scheinig & Hofmann, Linz, Austria.....*644
Steam shovels used in track connection .....(n) *613

RAILS:
Austrian rail joint of the wedge type, manufactured by Scheinig & Hofmann, Linz, Austria.....*644
Concrete reinforcement from re-rolled rails; Paper at annual meeting of the American Society for Testing Materials.....75, (Erratum) 181
Construction trestles with old rails for stringers *814
Electric rail-grinding machine.....*1181
Electric welding for track repairs and rail joints.....*298
Handling rails and heavy track material by machinery. By W. E. Davin 611
Improved slip-switch crossings; Pennsylvania R. R.....*254
Joint railway organization for the inspection of structural steel and steel rails. By A. W. Buel..(let) 86
Metal rolled from old rails for concrete reinforcement.....(ed) 81
New York, New Haven & Hartford R. R., Westerly, R. I., Oct. 28..(n) 891
Rail broken in fourteen places; Report recently issued by the engineer-physicist of the United States Bureau of Standards on a train derailment on the Louisville & Nashville R. R. near Hays Mills, Ala., Oct. 1, 1912.....*604
Rail failures and their causes. By M. H. Wickhorst.....*23
Rail failures in 1912; statistics of Rail Committee, American Railway Engineering Association..... 876
Rail-handling machine for rail renewals *1032
Railway accident statistics, Pennsylvania R. R., Statistics of passenger casualties.....(n) 18
Railway accidents. (See Accidents.)

RAILWAY CONSTRUCTION:
American Railway Bridge and Building Association; committee report... 889
Canadian Northern Ry.:
Describes new line between Montreal and Port Arthur. By Henry K. Wicksteed *68
Last two headings of Mount Royal tunnel connected Dec. 10....(n) 1260
Remarkable feat in railway construction and development; 3-mile tunnel through Mount Royal. By S. P. Brown.....*82
Carolina, Clinchfield & Ohio Ry., Railway construction through "the Breaks" in the Pine Mountain range (Cumberland Mountains); Kentucky-Virginia. By O. K. Morgan *762
Cost of, Concerning the railways of sixty years ago.....(ed) 314
Delaware, Lackawanna & Western R. R., Summit cutoff, west of Scranton, Penn.; Some of the heaviest railroading ever undertaken in the East; Details of the new line and its structures; construction methods.....*410

PAGE

RAILWAY CONSTRUCTION: (Cont.)
Idaho Northern Ry., Extension of 103 miles from Emmett north to Big Payetts Lake. By J. H. Smith..*101
Kansas City, Clay County & St. Joseph Ry., Problems of design and the more important details of construction. By Robert P. Woods..*688
Kansas City, Mo., Railway terminal system of Kansas City, Mo.....*237
Louisville & Nashville R. R., Suspension dumping bridge for building railway embankments.....*1024
Nashville, Chattanooga & St. Louis Ry., Grade reduction and double-tracking *802
Pennsylvania R. R., Grade elevation and six-tracking at Rahway, N. J. By John Jervis Vail.....*1118
Reconstruction of Mahanoy plane, Philadelphia & Reading Ry. By Joseph S. Ward.....*1220, (ed) 1247, (Erratum) 1322
San Pedro, Los Angeles & Salt Lake Ry., Flood destruction. By H. G. Tyrrell *16
Transandean Railway from Arica, Chile, to La Paz, Bolivia; 459-km. (144-mi.) meter-gage railway with a 24-mi. rack section, 11,800 ft. above sea-level. By G. H. Sawyer *1059
Willamette Pacific R. R., Tunnel 2480 ft. long, pierces the Coast Range Mountains between the Willamette Valley and the Siuslaw River.... 957
Railway contracts, China, Railway development since 1876.....(n) 932

RAILWAY EMPLOYEES:
Accidents to railway employees fruits of carelessness.....(ed) 467
Coöperative insurance for employees arranged by the Fourth Ave. Ry. of New York City.....(n) 645
England; Criminal prosecution of careless railway employees in Great Britain. By H. Raynar Wilson, (ed) 877, 886
New law for railway arbitration..(ed) 175
Pennsylvania R. R. employees suffering from communicable diseases debarred from dining cars....(n) 115
Railway signal towermen to remain on duty not more than nine out of 24 hours.....(n) 90
Safety exhibit car for education of employees; New York Central & Hudson River R. R.....(n) 308
System of medical inspection for employees.....(ed) 175

RAILWAY LOCATION:
Canadian Northern Ry., Describes new line between Montreal and Port Arthur; Description of exploration and survey work through a difficult and almost unknown and inaccessible region. By Henry K. Wicksteed *68
Curves:
Easement curves for street-railway track .....(n) 1035
Intersecting circular curves with non-parallel tangents: a theorem. By W. R. Horn.....*820
Railway curve formulas; Formula for swing of locomotive truck. By Kenneth McIntosh.....(let) 673
Reverse-curve crossover with unequal frogs .....(lets) *172, *364
Solution of special problem in reverse curves.....(n) 173

RAILWAY MAINTENANCE-OF-WAY:
Annual convention of the Roadmasters and Maintenance-of-Way Association, Chicago, Ill., Sept. 9-12..... 596
Cleaning stone ballast by screening; Experiments with screens instead of forks for cleaning, on the Baltimore & Ohio R. R. in 1912. By W. I. Trench.....*453
Field glasses for track inspection used on Prussian State Railway....(n) 173
Handling rails and heavy track material by machinery By W. E. Davin 611
Track inspection car; Erie R. R.; Dynagraph or track-inspection car which detects irregularities and imperfections; Autographic records of track conditions in diagram form.....*660

RAILWAY OPERATION:
Comparison of railway casualties in Great Britain and in the United States .....(ed) 671, 1132
Efficiency engineering achievements in the railway service .....(ed) 1245
England; Criminal prosecution of careless railway employees in Great Britain. By H. Raynar Wilson, (ed) 877, 886
Maintenance of electric railway equipment. By C. H. Quereau..... 28
Mexico, War-time railroading..... 929

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

RAILWAY OPERATION: (Continued)
Mobile & Ohio R. R., Inherent defect in the time interval system of railway operation. By C. E. Chappel ..... (let) *180
New York, New Haven & Hartford R. R.:
De-centralizing great organizations, (ed) 770
Investigation of rear collision of June 12 at Stamford, Conn.: Investigation of financial and other matters ..... (ed) 126
Observance of safety rules of Pennsylvania R. R. during August resulted in few failures in protection of employees ..... (n) 932
Pennsylvania R. R., Program for handling wrecks prepared for each division ..... (n) 928
Remarkable survival of the inclined plane, Mahanoy, Penn.; Philadelphia & Reading Ry. By Joseph S. Ward..... *1220, (ed) 1247
Requisites for apparatus for train control; American Railway Association, committee report on automatic train stops..... 252
Steel passenger cars and safe railway practice ..... (ed) 564
Wireless telegraphy for railway trains; Experimental installation on the Delaware, Lackawanna & Western R. R..... (ed) 1246
(See also Signals and signaling.)
Railway signaling. (See Signals and signaling.)

RAILWAY ORGANIZATIONS:
De-centralizing great organizations, (ed) 770
Organization for track-elevation work. *1307

RAILWAY STATIONS:
Boston, Mass., South Station, busiest railway terminal in the country, (n) 635
Brussels, Belgium, New railway stations and six-track tunnels..... *160
Chicago, Ill.:
Repairing the trainshed of the Union Station at Chicago..... (n) 361
(See also below under Railway terminals)
Hamilton, Ont., Union station and joint railway approach ..... (n) 574
Kansas City, Mo., Railway terminal system for Kansas City, Mo..... *237
Montreal, Que., Remarkable feat in railway construction and development: Canadian Northern Railway 3-mile tunnel through Mount Royal. By S. P. Brown..... *62
St. Paul, Minn., Temporary station destroyed by fire..... (n) 733, 779

RAILWAY STRUCTURES:
American Railway Bridge and Building Association; Committee report... 889
Engine houses, Improved locomotive terminal for Baltimore & Ohio R. R..... (n) 780
Philadelphia & Reading Ry.: Reinforced-concrete roundhouse under construction; Oil house and warehouse; Office building; Coal classification yards at St. Clair, Penn. By Joseph S. Ward..... *540
Snow fences of reinforced concrete used on the Italian State Railways, (n) *615

RAILWAY TERMINALS:
Boston, Mass., South Station, busiest railway terminal in the country, (n) 635
Brussels, Belgium, New railway stations and six-track tunnels..... *160
Chicago, Ill.:
Arnold report on the Chicago terminal situation..... *1154
City's growth and development hampered by zone or belt of railway terminals around the commercial center; Extensive projects under consideration..210, (ed) 222
Freight terminal for the "Soo Line"; All track space, team yards and freight houses on an upper floor or deck and the utilization of the space at ground level for freight storage *378
Railway-terminal problem to be investigated ..... (n) 435
Suggested changes in railway terminals; Extract from a report by John F. Wallace to the Committee on Railway Terminals of the City Council of Chicago.....923, *1154
Cumberland, Md., Improved locomotive terminal for Baltimore & Ohio R. R..... (n) 780
Dallas, Texas, $2,000,000 terminal for interurban electric railways projected by Stone & Webster.... (n) 77
Kansas City, Mo., Terminal system of Kansas City..... *237

PAGE

RAILWAY TERMINALS: (Continued)
Montreal, Que., Remarkable feat in railway construction and development; Canadian Northern Railway 3-mile tunnel through Mount Royal. By S. P. Brown..... *62
New York City:
Handling west-bound freight on the North River railroad piers. By W. J. Barney..... *309
Large pier and industrial development proposed for west shore of harbor ..... (n) 780
Philadelphia, Penn., Plans of Pennsylvania R. R., Baltimore & Ohio R. R., the Belt Line R. R. and the city for terminal improvements ..... (n) 251
Stronger buffers needed for railroad terminals ..... (ed) 519, *526

RAILWAY VALUATION:
Applicants for engineering positions on Federal Railway Valuation Board, (ed) 422
Can engineers be trusted to arbitrate fairly and intelligently between the public interests and the property interests?..... 120
Concerning the railways of sixty years ago ..... (ed) 314
Difficult point in the Railway Valuation law..... (ed) 829
Engineering positions under Railway Valuation Board not yet filled, (n) 635
Enormous amount of engineering work necessary for the task of railway valuation which the government has undertaken..... (ed) 31
Five railway valuation districts announced by Interstate Commerce Commission ..... (n) 807
Grades in examinations under Railway Valuation Board completed by the Civil Service Commission, (ns) 990, 1160, 1208
Life of physical railway property; Abstract of a report of the joint Committee on Life of Railway Physical Property of the American Electric Railway Engineering and Accountants' Associations..... 972
Results of examinations for railway valuation engineers..... (n) 946
State railroad commissioners' valuation committee to coöperate with the Interstate Commerce Commission, (n) 1159
Tabulation of results of civil service examinations for mechanical and electrical engineering positions under the Interstate Railway Valuation Board..... (n) 1332

RAILWAY YARDS:
Coal classification yards of the Philadelphia & Reading Ry. at St. Clair, Penn. By Joseph S. Ward. *540

RAILWAYS:
Alaska, Comments by Secretary Lane on conservation: Annual report of the Secretary of the Interior. (ed) 1312
Atchison, Topeka & Santa Fe Ry., Special features of new locomotives.. *279
Australia, Australian Circumferential Railway under construction... (n) 768
Baltimore & Ohio R. R.:
Ditching car..... *361
Improved locomotive terminal at Cumberland, Md..... (n) 781
Belgian State Rys., New railway stations and six-track tunnels at Brussels, Belgium..... *160
Canadian Northern Ry.:
Describes new line between Montreal and Port Arthur; Description of exploration and survey work through a difficult and almost unknown and inaccessible region. By Henry K. Wicksteed..... *68
Electrification of Montreal tunnel and terminal section..... (n) 734
Last two headings of Mount Royal tunnel connected Dec. 10.... (n) 1260
Remarkable feat in railway construction and development: 3-mile tunnel through Mount Royal. By S. P. Brown..... *62
Canadian Pacific Ry.:
Encouragement of forestation... (n) 155
Hopper-bottom steel-frame box cars for grain..... *806
Car lighting: committee report, Association of Railway Electric Engineers 888
Carolina, Clinchfield & Ohio Ry., Railway construction through "the Breaks" in the Pine Mountain range (Cumberland Mountains); Kentucky-Virginia. By O. K. Morgan *762

PAGE

RAILWAYS: (Continued)
Chicago, Ill.:
Arnold report on the Chicago terminal situation..... *1154
City's growth and development hampered by zone or belt of railway terminals around the commercial center; Extensive projects under consideration..... *210, (ed) 222
Chicago, Milwaukee & Puget Sound Ry., Snoqualmie Tunnel making good progress..... (n) 865
Chicago, Milwaukee & St. Paul Ry., Track elevation and portable concreting plant..... *26, (n) 365
China, Railway development since 1876..... (n) 932
Concerning the railways of sixty years ago ..... (ed) 314
Delaware, Lackawanna & Western R.R.: Lackawanna's Chief Engineer on the autoclave test. By G. J. Ray, (let) 272
Summit cutoff, west of Scranton, Penn.; Some of the heaviest railroading ever undertaken in the East; Details of the new line and its structures; construction methods *410
Wireless telegraphy for railway trains; Experimental installation on the Delaware, Lackawanna & Western R.R..... (ed) 1246
Duluth, South Shore & Atlantic Ry.:
Long girder span replacing a Howe truss put in place at Bad River crossing, Nov 16..... (n) 1260
Replacing a timber Howe truss with a long-span plate-girder; Bad River crossing, near Shilo, Wis. *1303
Efficiency engineering achievements in the railway service..... (ed) 1245
England, State purchase of railways in Great Britain. By H. Raynar Wilson.....1117, (ed) 1140
Erie R. R.:
Car-float service on the Chicago River..... (n) 574
Track inspection car; Dynagraph or track-inspection car, which detects irregularities and imperfections; Autographic records of track conditions in diagram form..... *660
Federal control of stock and bond issues..... (ed) 935
Hudson Bay Ry., Sir William Van Horne's criticism of..... (ed) 1311
Idaho Northern Ry., Extension of 103 miles from Emmett north to Big Payette Lake. By J. H. Smith.. *101
Inclined railways, Incline railway up Table Mountain, Cape Town, S. A., proposed..... (n) 320
Industrial:
Heavy locomotive built by Tennessee Coal, Iron and Railroad Co... (n) 452
Tennessee Coal, Iron & Railroad Co., Heavy industrial locomotive, for use on the 36-in. gage tracks at the Ensley steel works..... (n) 655
Italian State Railways, Snow fences of reinforced concrete in use on. (n) *615
Java State Rys., Tank locomotives of the 2:12:2 class built for.... (n) 675
Joint railway organization for the inspection of structural steel and steel rails. By A. W. Buel.. (let) 86
Kansas City, Mo., Terminal system of Kansas City, Mo..... *237
Life of physical railway property; Abstract of a report of the joint Committee on Life of Railway Physical Property of the American Electric Railway Engineering and Accountants' Associations..... 972
Long Island R. R., Block signal system ordered installed on the Whitestone Division, by the Interstate Commerce Commission, (ns) 635, 1259
Louisville & Nashville R. R., Suspension dumping bridge for building railway embankments..... *1024
Mexico, War-time railroading..... 929
Minneapolis & Northern Ry., Gasoline motor freight and switching locomotive *745
Minneapolis, St. Paul & Sault Ste. Marie Ry., Freight terminal, Chicago, Ill..... *378
Missouri Pacific Ry., Moving a three-span truss bridge over the Kaw River at Kansas City. By C. E. Smith *54
Nashville, Chattanooga & St. Louis Ry., Grade reduction and double tracking *802
New law for railway arbitration.. (ed) 175
New York Central & Hudson River R. R.; Safety exhibit car for education of employees..... (n) 308
New York, New Haven & Hartford R. R.:
De-centralizing great organizations, (ed) 770

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

RAILWAYS: New York, New Haven & Hartford R. R.: (Continued)
Investigation of rear collision of June 12 at Stamford, Conn.; Investigation of financial and other matters.....(ed) 126
Latest and worst New York, New Haven & Hartford R. R. disaster, (n) 484, (ed), *520, *525, 564
Manual-control block-signal system to be replaced by electric automatic system.....(n) 386
New train schedule for 1300 trains Oct. 5.....(n) 733
Prize of $10,000 for best automatic stop.....(n) 186
Railway tie purchases in New England during the past year....(n) 503
Spacing of distant signals.....(ed) 176
Norfolk & Western Ry.: Single-phase electric-traction system to be installed on a mountain section; 11,000-volt...(ed) 269, (ns) 277, 435
Panama R. R., Hardwood ties on; Remarkably long service.....1166
Pennsylvania R. R.:
Electrification of Germantown branch from Philadelphia to Chestnut Hill.....(n) 733
Grade crossings on highways....(n) 626
Grade elevation and six-tracking at Rahway, N. J. By John Jervis Vail *1118
Improved slip-switch crossings.....*254
Large pier and industrial development proposed for west shore of New York harbor.....(n) 780
Observance of safety rules during August resulted in few failures in protection of employees.....(n) 932
Program for handling wrecks prepared; each division.....(n) 928
Record freight-car handling for July, 1913 .....(n) 276
Statistics of passenger casualties.(n) 18
Steel lunch-counter car between New York and Philadelphia.....(n) 1159
Two steel "business cars" being built, (n) 857
Philadelphia, Penn., Plans of Pennsylvania R. R., Baltimore & Ohio R. R., the Belt Line R. R. and the city for terminal improvements, (n) 251
Philadelphia & Reading Ry.:
Coal classification yards, at St. Clair, Penn. By Joseph S. Ward.*540
Reconstruction of Mahanoy plane; Early railroads; Inclined planes; Development of mines and railways. By Joseph S. Ward..*1220, (ed) 1247, (Erratum) 1322
Renewing switches with wrecking cranes .....(n) 981
Prussian State Rys., Semaphore signal with illuminated parabolic blade.*1234
San Pedro, Los Angeles & Salt Lake Ry., Flood destruction. By H. G. Tyrrell *16
South Africa, Railway requirements greater than ever before.....(n) 373
South America, Transandean Railway from Arica, Chile, to La Paz, Bolivia; 459-km. (144 mi.) meter-gage railway with a 24-mi. rack section, 11,800-ft. above sea-level. By G. H. Sawyer.....*1059
Southern Pacific Ry., Obstinate railway tunnel fire in California; Santa Margarita tunnel of the Southern Pacific Co.....1234
Southern Pacific R. R. of Mexico, Wartime railroading.....929
State railway control in the United States. By H. Raynar Wilson, 1117, (ed) 1140
St. Louis and San Francisco R. R., More revelations in "high finance"; Investigation of, by the Interstate Commerce Commission.....(ed) 1091
Swedish State Railways, Diesel-electric motor cars on.....(n) 605
Swiss Federal Rys., Electrification of the St. Gotthard Railway.....1159
Switzerland, Two large concrete arches on a Swiss mountain railway; 315-ft. Langwiese arch; Grundje-Tobel bridge, Chur-Arosa Railway....*1294
United States, Interstate Commerce Commission's report on railway statistics in 1912.....303
Willamette Pacific R. R., Tunnel 2480 ft. long, pierces the Coast Range Mountains between the Willamette Valley and the Simslaw River... 957

RAINFALL:
Comparison of Panama and Croton rainfall, runoff and evaporation data *1010
Deficient rainfall in the summer of 1913 905
Determining power possibilities on a watershed; Method of constructing curves, requisite to the power determinations. By Lyle A. Whitsit *496
Galveston, Tex., Twelve inches of rain in twelve hours. By A. T. Dickey 945

PAGE

RAINFALL: (Continued)
Hawaiian Islands, Average rainfall of little over 1 in. per day on Island of Maui.....(n) 245
Heaviest concentrated rainfall ever recorded in New York City occurred July 28.....(n) 277
Illinois, Phenomenally heavy rain in 1912 245
New York City:
Heavy rainfall of Sept. 5.....(n) 528
Most severe of three record concentrated rainfalls, Oct. 1..(n) 781, *887
Remarkable rainfall of Oct. 1, 1913 *887
Precipitation and runoff, Ishikari River, Japan, with special relation to ice conditions. By B. Okazaki.....*850
Problem of finding the proper turbine capacity to be installed at a water-power site .....*462, (let) 674
Record rainfall at Panama.....(n) 90
Seventy-five year record of rainfall; St. Paul, Minn.....*514
Source of heavy rainfalls..... 8
Special rain gage with large storage reservoir used by U. S. Geological Survey .....(n) 209
Ten-inch rainfall in San Salvador, Oct. 27-28.....(n) 946
Rapid transit. (See Elevated railways; Subways; etc.)

RECORDING AND INDICATING INSTRUMENTS:
Australian water meter for irrigation supplies; devised by J. S. Dethridge, of Melbourne.....*1283
Device for measuring the inflow of water into shafts.....(n) *1308
Live-load strain-gage using scissors principle; designed by J. E. Howard, Bureau of Standards, Washington, D. C.....*701
Method of current-meter rating, California Development Co. By J. B. Brown *712
Track inspection car; Erie R. R.; Dynagraph or track-inspection car, which detects irregularities and imperfections; Autographic records of track conditions in diagram form *660
Visible scale for torsion power meters, (n) 1194
Refuse disposal. (See Garbage and refuse disposal.)

REFRIGERATION:
Abstract of papers at third International Congress of Refrigeration, Chicago, Sept. 17-24, 1913..... 679
New shipping outfit for iced-water samples *819
Thermal testing plant at the Pennsylvania State College. By J. A. Moyer 695
Reports, Preparation of engineering reports. By Edward Beattie Stephenson 1218
Research, Passing of Edisonian research, (ed) 717, 724

RESERVOIRS:
Application of the flow-summation curve to problems of stream regulation and storage. By E. Clinton Jansen *1290
Auburn, N. Y., Water and air movement in relation to the contamination of the lake water-supply..... 356
Determining power possibilities on a watershed; Methods of constructing curves, requisite to the power determinations. By Lyle A. Whitsit *496
Effect of proposed storage reservoirs on steam flow and water power on the Lower Chippewa River, Wis. By Clinton B. Stewart.....*246
Fort Smith, Ark., Collapse of a thin partition wall in water-works settling basin. By Walter R. Mason, *1049, *1179, (let) 1321
Hetch Hetchy:
San Francisco wins its long fight, (ed) 1312
Water supply bill passed United States Senate on December, 6, (n) 1259
Paper on water movement, air movement and lake contamination; Annual convention of the American Water Works Association..... 44
Preliminary report on Dayton flood protection ..775, (lets) 880, (n) 989
Preliminary report of Army Engineers on the Central States floods; Central control recommended; reservoirs of no use.....725, (ed) 771
Report of British experts on a new water-supply for Ottawa, Ont., 1012, (ed) 1038
San Diego, Calif., Purchase of Southern California Mountain Water Co. system .....(n) 86
Seattle, Wash., Proposed reforestation of the Cedar River watershed....*480

PAGE

RESERVOIRS: (Continued)
Simple concrete forms for inside of reservoir wall, Pleasantville, N. Y., (n) *1309
Waldeck storage dam, on the River Eder, Germany. By Robert Grimshaw *852

RETAINING WALLS:
Abutments. (See Abutments.)
Basalt facing for concrete wall, Hamburg Harbor..... 929
Bridge abutments with cantilever wings *817
Design of concrete abutments without wing walls for deck girders. By C. M. Luther *816
Design of standard reinforced concrete retaining walls. By H. M. Gibb, *170, (n) 274
Earth pressure against foundation walls; Failure of an 18-in. rubble wall at Manhattan, Kansas. By R. A. Seaton.....(let) *721
Formulas for finding the intersections of wing walls with the main abutments of bridges. By S. Reswick, *366, (Erratum) 626
Formulas for length and height of abutment wing-walls, for skew crossings .....(n) *1309
Grouting process for preventing slides on the Panama Canal. By A. S. Zinn *406
New York State barge canal crossing of Oak Orchard Creek, Medina, N. Y. By Noble E. Whitford.....*192
Retaining walls of molten slag at Butte (Mont.) reduction works.....(n) 568
Sliding ground in Culebra cut, Panama Canal. By Donald F. MacDonald 408
(See also Walls and bins.)
Revetment, Cairo, Ill., Plank and earth bulkhead wall on river front....*104
River and stream pollution. (See Water pollution.)

RIVER DISCHARGE AND VELOCITY:
Ambitious river regulation plan, in a bill introduced in the Senate of the United States by Senator Newlands of Nevada.....(ed) 470
Application of the flow-summation curve to problems of stream regulation and storage. By E. Clinton Jansen *1290
Artificial controls for stream gaging stations; Small barriers of concrete or of rubble leveled off with cement-mortar; Types of artificial barriers and rating curves for each type. By G. S. Strout..(let) 226
Bill for flood protection drafted by National Drainage Congress....(n) 47
Comparative flow of Ohio and Tennessee Rivers. By A. H. Horton.(let) 1143
Chippewa River (Wis.), Effect of proposed storage reservoirs on stream flow and water power. By Clinton B. Stewart.....*246
Determining power possibilities on a watershed; Methods of constructing curves, requisite to the power determination. By Lyle A. Whitsit *496
Maximum flood of Hudson River at Albany, N. Y., March, 1913.....(n) 947
Origin and theory of the pitot tube. By John Airey.....(let) 226
Phenomenally heavy rain in Illinois in 1912 245
Precipitation and runoff, Ishikari River, Japan, with special relation to ice conditions. By B. Okazaki *850
Problem of finding the proper turbine capacity to be installed at a water-power site.....*462, (let) 674
River ferry as a stream-gaging station, on the John Day River in Oregon; U. S. Geological Survey. By W. C. Sawyer *610
Systematic stream-gaging by Ohio state authorities .....(n) 1208

RIVERS:
Ambitious river regulation plan, in a bill introduced in the Senate of the United States by Senator Newlands of Nevada.....(ed) 470
Chicago, Bypass channel on Chicago River being partially destroyed, (n) 435
China, Chinese famine and proposed flood prevention. By Charles Davis Jameson *588
Chippewa, Effect of proposed storage reservoirs on stream flow and water power. By Clinton B. Stewart...*246
Delaware, Studies of river bottoms at Philadelphia in relation to sewage disposal *918
Hudson Maximum flood at Albany, N. Y., March, 1913.....(n) 947
International investigation of the pollution of boundary waters between the United States and Canada, (ed) 689

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

RIVERS: (Continued)
Ishikari, Japan, Precipitation and run-off, with special relation to ice conditions. By B. Okazaki.....*850
Jones' Falls, Baltimore, Md., Covering of Jones' Falls; an open creek, taking the drainage of the city's streets and houses, and long notorious as a public nuisance; used as a low-grade street connecting railway stations.....*2, *927
Miami:
Flood prevention in different localities .....775, (lets) 880, (n) 989
Report on flood protection for Troy, Ohio, by the Morgan Engineering Co. *1292
Mississippi:
Adoption by a New York City commercial organization of a resolution approving the fantastic scheme of Mr. Riker.....(ed) 1091
Dry weather levee failures...(ed) 1037
Flood-control problem summarized..1121
Floods and levees at one of the most vulnerable points from a flood standpoint in the Mississippi Valley *104
Hydraulic dredging on the upper Mississippi River; Methods and costs. By R. Monroe.....*143
Sloughing off of the Mississippi levee at Helena, Ark.....*1014, (ed) 1037
Ohio:
Locks at Louisville, Ky.; Navigation lock independent of the dam, located in a canal which affords passage around "the falls"; Proposed reconstruction of the river dam; Construction plant and methods employed.....*1238
Comparative flow of Ohio and Tennessee Rivers. By A. H. Horton, (let) 1143
Ottawa, Flood protection for Lima, Ohio; Report on protective work against inundation by the Ottawa River, made by the W. J. Sherman Co., Consulting Engineers, of Toledo, Ohio..... 828
Philadelphia, Penn., Studies of river bottoms in relation to sewage disposal *918
Preliminary report of Army Engineers on the Central States floods; Central control recommended; Reservoirs of no use.....725, (ed) 771
Rhine, Germany; Prize competition for river improvement plans.....(n) 555
Sacramento, Large clam-shell dredges; Levee building methods and standards in California. By Fred H. Tibbetts *456
Schuylkill, Studies of river bottoms at Philadelphia in relation to sewage disposal.....*918
Tennessee, Comparative flow of Ohio and Tennessee Rivers. By A. H. Horton .....(let) 1143

RIVETS AND RIVETING:
Pneumatic riveting; Continental Bank Building, Chicago, Ill.....(n) 1304
Shear and rivet diagram for railway plate-girders *823
Road machinery, Recent improvements in macadam road machinery. By A. W. Dean..... 603
Roadmasters and Maintenance-of-Way Association, Annual convention, Chicago, Ill., Sept. 9-12..... 596

ROADS:
Annual convention of the American Road Builders' Association, Philadelphia, Penn., Dec. 9-12.....1256
Bridges and culverts for country roads; Paper before American Road Congress. By A. R. Hirst..... 729
Causes of wear and deterioration of roadways. Laurence J. Hewes.. 587
Concrete. (See Pavements.)
Cuyahoga County, Ohio, Brick-paved country roads built during the past five years in the territory surrounding Cleveland, Ohio. By James M. McCleary....749, (ed) 933
Early, Letter by John Louden M'Adam, the roadbuilder..... 118
Economy in road location on sandy soils 345
Effect of heavy motor traffic on cost of road maintenance..... 630
Employment of convicts on road work in New Jersey authorized by State legislature of 1913.....(n) 561
Federal aid, More agitation for federal aid to highway construction. By R. B. Wheeler...(ed) 986, (let) 1094
Good roads exhibit to be held at Ohio State Fair Sept. 1-5.....(n) 387
Governor of Missouri as grand pathmaster .....(ed) 811
Horseshoe that will minimize road damage .....(n) 157
Illinois, Highway administration advanced materially under new law, (n) 161

PAGE

ROADS: (Continued)
Instructions for foremen and contractors on state road construction in Wisconsin..... 291
International Road Congress excursion to North Wales. By E. L. Corthell 215
Iowa, New Iowa road law. By A. Marston 131
Lincoln Highway Association to build an Atlantic-Pacific highway; Scheme to make federal memorial to Abraham Lincoln.....(ed) 519
Macadam. (See Pavements.)
Missouri good roads movement, Aug. 20-21 .....(n) 434
National Good Roads meetings; Futility of passing resolutions...(ed) 1091
New York State:
High percentage of profit on state road contract.....(n) 779
Investigation of highway work, (ed) 1142
Long-term guarantees on State highway contracts. By F. R. Upton, (ed) 1196, (let) 1316
Preliminary inspection by new division engineers.....(n) 1056
Prospects of state highway administration .....(ed) 829
Regulations governing the use of a patented material on New York State road construction.....(n) 276
Road organization; Complete reorganization of the New York State Highway Department recommended by the Board of Consulting Engineers 982
Specifications for New York State highway work.....1203
Types of New York State roads; Classes of pavements adapted to different kinds of traffic requirements; Cost data; Conclusions based on several years' experience. By W. G. Harger.....*1148
Panama-Pacific International Exposition of 1915, at San Francisco, Calif.: Roads and pavements. By A. H. Markwart.....*1070
Paper on highway engineering; Annual meeting of the Society for the Promotion of Engineering Education 46
Pennsylvania:
Fifty million dollars bond issue defeated .....(n) 989
One way to cure bad roads; Indictment of State Highway officials, (ed) 617
Vote on a $50,000,000 bond issue for good roads .....(ed) 986
Philippine Islands:
Provincial public works organization and its engineering personnel. By E. J. Westerhouse.....*958
Task system of constructing roads, (n) *365
Plea for earth roads by James M. McCleary .....(ed) 933
Preventing washouts on embankments; Railing with subsurface curb for shoulders of road embankments. By Roland Watts.....*1304
Problem of economic road construction, (ed) 619
Proceedings of the Third International Road Congress, London, England, June, 1913..... 182
Regulations issued for protecting state and county highways in New York .....(n) 857
Resolutions adopted by the American Road Congress at Detroit....(n) 780
Road funds from the national forests, (n) 801
Third annual American Road Congress, Detroit; Brief abstract of proceedings 726
Treatment of worn out and raveled macadam road surfaces; Paper before American Road Congress. By E. A. Stevens..... 728
United States Good Roads Association convention, St. Louis, Nov. 10-14, (n) 1056
University of Illinois. Two weeks course in Highway Engineering for new county and town highway superintendents at the.....(ed) 1311
Unsurfaced roads; abstract of paper before the American Road Congress, Detroit, Mich. By W. S. Keller 767
Wayne County, Mich., Concrete roads; Paper before American Road Congress. By Frank H. Rogers..... 730
West Virginia, Good roads extravagance and good sense.....(ed) 367
(See Pavements.)
Rock crushers, Cleaning stone ballast by screening; Experiments with screens instead of forks for cleaning, on the Baltimore & Ohio R. R. in 1912 By W. I. Trench.....*453

PAGE

ROCK SLIDES:
Canadian Pacific Ry., Ruby Creek, Man., Nov. 17.....(n) 1107
Catskill Aqueduct tunnel near Shaft 2, Mosholu Parkway and Jerome Ave., New York, Aug. 1.....(n) 323

ROCKWORK:
Arrowrock Dam, Idaho, Excavation for; Drag-line excavator, Orange-peel buckets, skips from cableways, hydraulic jets, blasting used in loosening. By Charles H. Paul... *93
Breaking quarry stone with a cannon ball .....(n) *822
Cutting an expansion joint in a concrete wall .....(n) 1308
Economies on small rock-drilling jobs.1305
Landslide in Lexington Ave. subway, New York City, Sept. 29.....(n) 733
Rock grouting and caisson sinking for the Hales Bar dam, Tennessee River, Hales Bar, Tenn. By A. H. Horton ..*949, (ed) 1038, (let) 1143
Rules for misfires in blasting..1227, (ed) 1245
Selection of explosives for engineering work; Comparative energies of commercial explosives..... 495
Sledge for breaking rock.....(n) 366
(See also Drills and drilling.)
Roller skating, Roller skates used for business purposes in store room of the Union Street Ry. at New Bedford, Mass.....(n) 611

ROOFS:
Large arch-truss drill-hall; Roof carried by a series of three-hinged arch trusses of novel design and construction; Armory for the University of Illinois, Urbana, Ill..*1182
Repairing the trainshed of the Union Station at Chicago.....(n) 361
Rossell, William R., Biographical sketch of *321
Roundhouses. (See Railway structures.)
Run-off. (See Drainage areas; Rainfall.)

S

Safes, Bank vault of the Guaranty Trust Co. of New York City.....*262

SAFETY DEVICES:
Abstract of the report of the Committee on Hulls and Bulkheads, Department of Commerce.....(n) 834
Accidents to railway employees fruits of carelessness .....(ed) 467
Automatic sprinklers as life savers. By Sidney G. Koon.....(let) 373
Firedamp whistle invented.....(n) 1166
Loss of the "Volturno" and lifeboat equipment of ships..(ed) 769, (n) 780
Missouri occupational disease law. By W. J. Reiss.....(let) 425
Pennsylvania R. R., Observance of safety rules during August resulted in few failures in protection of employees .....(n) 932
Preventing accidents by recording dangerous conditions..... 943
Safeguarding life in factory fires; Life hazard in crowded buildings due to inadequate exits.....(ed) 224, *228, (let) 373
Safety exhibit car for education of employees; New York Central & Hudson River R. R.....(n) 308
Safety rules for handling construction materials .....(n) 365
Underlying cause of accidents in the Pennsylvania R. R. investigation, (ed) 81
Why "safety first" is sound economy. By Alexander Haring.....1295

ST. PAUL, MINN.:
Sprinkling and oiling streets; organization, methods, cost and method of assessing cost..... 295
Water-works organizations and operating methods; St. Paul, Minn., and San Diego, Calif. By H. A. Whitney.....*475, (let) 622

SAND:
Economy in road location on sandy soils 345
New method of testing.....(n) 173

SAN DIEGO, CALIF.:
Drastic provisions of the water-works ordinance 478
Water-works organizations and operating methods; St. Paul, Minn., and San Diego, Calif. By H. A. Whitney .....*475, (let) 622

SAN FRANCISCO, CALIF.:
City wins its long Hetch Hetchy fight, (ed) 1312
Municipal street-railway lines to furnish transportation for the Panama-Pacific Canal Exposition.(n) 484
Net profit of the municipal railway for six months to July 31, 1913..(n) 484

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

SANITATION: PAGE
Camp Hill View sanitation, Catskill Aqueduct; General description; Sanitary conveniences; Sanitary clauses of the contract; Carrying out of the sanitary measures. By Arthur W. Tidd. *752
Employment of engineers in the Federal Public Health Service..(ed) 1245
Lessons from a profitable water cress typhoid outbreak.....(ed) 311, *322
Missouri occupational disease law. By W. J. Reiss.....(let) 425
Pennsylvania R. R. employees suffering from communicable diseases debarred from dining cars.....(n) 115
Public-health exhibit train run through Michigan .....(n) 162
Recent investigations of the bactericidal, deodorizing and physiologic action of ozone. By W. H. Thompson.....(ed) 1092, 1096, (let) 1319
Sawdust, Building a levee across an old sawdust bed. *169
Scaffolding, German "ladder" staging..*606

SCALES:
American Railway Bridge and Building Association; committee report.... 891
Interstate Commerce Commission's Report on railway-track scales..... 322
Scientific management: (See Efficiency engineering; Labor; Shops and factories.)

SCRAPER EXCAVATORS:
Excavating with large scrapers; University of Illinois; Maney scraper. By A. B. McDaniel. *1302
Simple power scraper outfit used for earth stripping; Middlebury, Vt., (n) 1035
Unloading broken stone or gravel from cars by scraper. By Ralph Bennett *1030
Screens, Cleaning stone ballast by screening; experiments with screens instead of forks for cleaning on the Baltimore & Ohio R. R. in 1912. By W. I. Trench. *453
Seaside resorts, How to build and improve seaside resorts. By John S. Brodie 245

SEAWALLS:
Basalt facing for concrete wall, Hamburg Harbor. 929
Hamburg, Germany, Typical Hamburg quaywall. *938
Tile protection for intertidal concrete in sea walls. *1178

SEEPAGE:
Facts about percolation from canals. By W. C. Hammatt.....(let) *881
Lining an irrigation ditch with Hess metallic fluming. By Elbert M. Chandler *464
Seepage losses from earth canals. *402, (let) *881

SEWAGE DISPOSAL:
Brunswick, Ga., Sanitary pail system for sections of city without sewers .....(n) 230
Camp Hill View sanitation, Catskill Aqueduct; General description; Sanitary conveniences; Sanitary clauses of the contract; carrying out of the sanitary measures. By Arthur W. Tidd. *752
Chicago, Ill., Bypass channel on Chicago River being partially destroyed .....(n) 435
Committee reports on sewerage and sewage disposal and on river cleaning; American Public Health Association 759
Construction of sewage-collecting systems rather than the building of sewage-treatment works in the cities and towns of North Carolina encouraged by the State Board of Health .....(ed) 1195
Experiments on sludge digestion at Lawrence, Mass., and London, England. By Rudolph Hering. (let) 317
Farm method, Imhoff sewage tank and proposed sewage farm for Torrance, Calif. By Ralph Bennett. *1132
International investigation of the pollution of boundary waters between the United States and Canada. (ed) 669
Lessons from a never-used sewage-treatment plant.....(ed) 423
Milwaukee, Wis., Commissioners selected on sewage disposal project..(n) 780
New Bedford, Mass., Intercepting sewer with screen and grit chambers at its lower end, and an outfall sewer into Buzzard's Bay. By Walter N. Charles *216
New Jersey, Municipal sewage-treatment plants 1232
New York City, New York Sewer Plan Commission to develop plan for sewage disposal.....(n) 132
Orange-Montclair-East Orange, N. J., Sewage-disposal scheme officially adopted Aug. 11.....(n) 435

SEWAGE DISPOSAL: (Continued) PAGE
Passaic Valley:
Discharge of sewage into New York Bay .....(n) 434
Three 100,000,000-gal. submerged centrifugal pumps to be installed at Newark Bay pumping station, (n) 90
Rules governing the submission of sewerage and water-supply plans to the New Jersey State Board of Health 548
Separate and combined sewers in relation to sewage disposal. By John H. Gregory. 875
State control of sewage disposal; Abstract of paper before American Society of Municipal Improvements 776
Studies at the Lawrence Experiment Station upon the disposal of sewage sludge in deep tanks. 13
Studies of river bottoms at Philadelphia in relation to sewage disposal. *918
Treatment of sewage discharged into tidal waters; Anomalies in sewage-treatment requirements for various municipalities on the River Thames, England. 401

SEWAGE TREATMENT:
Chemical disinfection, Hypochlorite disinfection of sewage at Providence, R. I. 1292
Clarification of sewage in slate beds; Description of construction and operation of slate beds with data concerning their efficiency, limitations and cost. *641
Committee reports on sewerage and sewage disposal and on river cleaning; American Public Health Association 759
Construction of sewage-collecting systems rather than the building of sewage-treatment works in the cities and towns of North Carolina encouraged by the State Board of Health.....(ed) 1195
Dallas, Tex., Plans for sewage treatment works being prepared....(n) 435
Erith, England, Treatment of sewage discharged into tidal waters; Anomalies in sewage-treatment requirements for various municipalities on the River Thames, England 401
Experiments on sludge digestion at Lawrence, Mass., and London, England. By Rudolph Hering. (let) 317
Imhoff tanks:
Imhoff sewage tank and proposed sewage farm for Torrance, Calif. By Ralph Bennett. *1132
Waverly Hill Anti-Tuberculosis Sanitorium, near Louisville, Ky.; screen chamber; Imhoff tanks; sprinkling filters. By P. H. Norcross *558
Indianapolis, Ind., Experimental sewage-disposal station under construction .....(n) 387
Industrial city of Torrance, Calif.; General layout of the city and its various public improvements described. By Ralph Bennett. *870
Lessons from a never-used sewage-treatment plant.....(ed) 423
Municipal sewage-treatment plants in New Jersey. 1232
Orange-Montclair-East Orange, N. J., sewage-disposal scheme officially adopted Aug. 11.....(n) 435
Pennsylvania, Second defeat for state aid for municipal sewage-treatment work .....(ed) 467
Providence, R. I., Hypochlorite disinfection of sewage. 1292
Rules governing the submission of sewerage and water-supply plans to the New Jersey State Board of Health. 548
Scotia, N. Y., Lessons from a never-used sewage-treatment plant..(ed) 423
Septic tanks, Patent infringement suit of Cameron Septic Tank Co. vs. Monmouth, Ill. dismissed, Nov. 11 .....(n) 1159
Slate bed filters, Clarification of sewage in slate beds; Description of construction and operation of slate beds with data concerning their efficiency, limitations and cost. *641
Springfield, Mo., Sewage treatment works with motor-driven reversible distributor *1112
Springfield, Ohio, Abstract of paper before American Society of Municipal Improvements 776
Sprinkling filters:
Construction and operation of slate beds with data concerning their efficiency, limitations and cost...*641
Sewage-treatment works with motor-driven reversible distributor, Springfield, Mo. *1112
Studies at the Lawrence Experiment Station upon the disposal of sewage sludge in deep tanks. 13

SEWAGE TREATMENT: (Continued) PAGE
Syracuse, N. Y. Sewage-purification works to be built.....(n) 387
Torrance, Calif., Imhoff sewage tank and proposed sewage farm. By Ralph Bennett *1132
Treatment of sewage discharged into tidal waters; Anomalies in sewage-treatment requirements for various municipalities on the River Thames, England. 401
Waverly Hill Anti-Tuberculosis Sanitorium, near Louisville, Ky.; screen chamber; Imhoff tanks; sprinkling filters. By P. H. Norcross *558
Sewer explosions, Disastrous sewer explosion in Pittsburgh, Penn.....*1157

SEWERAGE:
Baltimore, Md., Covering of Jones' Falls; an open creek, taking the drainage of the city's streets and houses, and long notorious as a public nuisance; used as a low-grade street connecting railway stations *2, *927
Chicago, Ill., Reconstruction of downtown sewers under consideration, (n) 946
Committee reports on sewerage and sewage disposal and on river cleaning; American Public Health Association 759
Construction of sewage-collecting systems rather than the building of sewage-treatment works in the cities and towns of North Carolina encouraged by the State Board of Health .....(ed) 1195
Instructions to field parties for the subsurface survey of Cincinnati, Ohio. *1080
Louisville, Ky., Engineering, administration and incidental expenses of contract sewer expenses....(n) 615
Milwaukee, Wis., Commissioners selected on sewage disposal project..(n) 780
New Bedford, Mass., Intercepting sewer with screen and grit chambers at its lower end, and an outfall sewer into Buzzard's Bay. By Walter N. Charles *216
New York City, New York Sewer Plan Commission to develop plan for sewage disposal.....(n) 132
Panama-Pacific International Exposition of 1915, at San Francisco, Calif.; Sewers and sanitary equipment. By A. H. Markwart.....*1070
Rules governing the submission of sewerage and water-supply plans to the New Jersey State Board of Health 548
Separate and combined sewers in relation to sewage disposal. By John H. Gregory. 875
What is a proper allowance for depreciation in a sewerage system? (ed) 1093

SEWERS:
Baltimore, Md., Covering of Jones' Falls.....*2, *927
Belt conveyor used for back-filling a sewer .....(n) 196
Boston, Mass., Rates paid for hired machinery in construction of sewers .....(n) 615
Brooklyn, N. Y., Subaqueous sewer construction *1064
Chicago, Ill., Reconstruction of downtown sewers under consideration, (n) 946
Collapse of an old 5-ft. brick sewer, St. Louis, Mo. *776
Disastrous sewer explosion in Pittsburgh, Penn. *1157
Hydraulic comparison of equivalent egg-shaped and circular sewers when flowing full. *252
Industrial city of Torrance, Calif.; General layout of the city and its various public improvements described. By Ralph Bennett. *870
Need for proper inspection of sewer connections. By Norman M. Paul, (let) 832
New Bedford, Mass., Intercepting sewer with screen and grit chambers at its lower end, and an outfall sewer into Buzzard's Bay. By Walter N. Charles *216
New York City, New York Sewer Plan Commission to develop plan for sewage disposal .....(n) 132
Pittsburgh, Penn., Disastrous sewer explosion in Pittsburgh. *1157
Quick lime for thawing frozen ground, (n) 364
Rules governing the submission of sewerage and water-supply plans to the New Jersey State Board of Health 548
Separate and combined sewers in relation to sewage disposal. By John H. Gregory. 875
Sewer construction in quicksand; West Liberty, Iowa. 1027

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

SEWERS: (Continued)
Suggested simplification for the value of C in Kutter's formula and a sewer discharge diagram. By Alfred Boyd .....(let) *316
Shale, Distillation of oil from bituminous shales .....(n) 479
Shipping outfit for iced-water samples...*819

SHIPS:
Abstract of the report of the Committee on Hulls and Bulkheads, Department of Commerce.....(n) 834
Cargo of elephants swing a ship..(n) 1188
Falling steel shaft sank ship in East River, Dec. 8.....(n) 1260
Floating factory for ship repair work, (n) 560
Flue gas for fire fighting on shipboard .....1235, (ed) 1247
Gas engine:
Diesel engine ship "Hagen" at New York City.....(n) 29
Diesel oil engine ship "Wotan" largest single-screw oil motor ship yet built.....(n) 833
Inland navigation barges with producer-gas engines; Alabama & New Orleans Transportation Co. to operate between the coal fields of Alabama and the city of New Orleans *1109
Performance of the oil-engine ocean vessel "Christian X" of the Hamburg-American Line..... 347
Important additions to steamship service to be made by Hamburg-American Line and North German Lloyd S. S. Co.....(n) 435
Inert gases for fighting fire at sea, 1235, (ed) 1246
Injury to the hull of the U. S. S. "Arkansas" by grounding.....*439
Loss of the "Volturno" and lifeboat equipment of ships.(ed) 769, (n) 780
Raising a wrecked Atlantic liner by compressed air..... 419
Recent disasters to lake shipping, (ed) 1141
Steamships:
"Imperator" of the Hamburg-American Line; Description of.. *49
"Imperator" on fire, Hoboken, N. J., Aug. 28 .....(n) 484
Repairing a damaged steamship while floated by compressed air; Trans-atlantic steamer "Uranium", (n) 615
Visible scale for torsion power meters, (n) 1194
Shipwrecks. (See Accidents.)

SHOPS AND FACTORIES:
Automatic sprinklers as life savers. By Sidney G. Koon.....(let) 373
Bureau of Engraving and Printing, Washington, D. C.: a modern high-class factory building, 505 ft. by 300 ft. By Fred W. Lepper.....*335
Dismissing factory employees daily by ringing the fire bell.....(n) 461
Expansive power of water-soaked wood .....(n) *615
Floating factory for ship repair work, (n) 560
Gasoline motor trucks in a railway repair shop; Nippes, Germany..(n) 614
Industrial management; Paper at Leipzig meeting of American Society of Mechanical Engineers.. 128
Motor inspection and maintenance in industrial plants; Edison Electric Illuminating Co., Brooklyn, N. Y. By F. E. Hanchette.....*746
Need of a new official in certain manufacturing plants. By H. C. Spaulding .....(let) 35
Preventing accidents by recording dangerous conditions..... 943
Safeguarding life in factory fires; Life hazard in crowded buildings due to inadequate exits....(ed) 224, *228, (let) 373
Tidewater Portland Cement Co., Baltimore, Md.; Categorical description of a modern cement and hydrated lime plant. By Richard K. Meade.....*858
(See also Education, Industrial; Labor.)
Shore protection. (See Coast erosion.)

SIDEWALKS:
Control of sidewalk construction and maintenance 778
Protecting street traffic from falling objects during building construction *356

SIEVES:
Sieve test for cement that insures uniformity in fineness. By G. J. Griesenauer 1296
Suggested improvement in sieve standardization. By Bernard Enright, (let) 524
Signals, Manual signals for field engineers *360

PAGE

SIGNALS AND SIGNALING:
Acetylene for lighting block signals tried by the Boston & Maine R. R. at Reading, Mass., and the Chicago Great Western R. R. at Maywood, Ill.....(n) 29
Apprenticeship course in signal engineering established by Union Switch & Signal Co.....(n) 196
Automatic stops:
Prize of $10,000 for best automatic stop offered by New York, New Haven & Hartford R. R....(n) 186
Requisites for apparatus for train control; American Railway Association, committee report on automatic train stops..... 252
Block signal system ordered installed on the Whitestone Division of the Long Island R. R. by the Interstate Commerce Commission, 634, (ns) 1259
Comparison of railway casualties in Great Britain and in the United States .....(ed) 671, 1132
Faulty block signals the cause of the latest and worst New York, New Haven & Hartford R. R. disaster, (n) 484, (ed) *520, *525, 564
Inherent defect in the time interval system of railway operation By C. E. Chappell.....(let) *130
Interlocking plant moved without interrupting operation, at Kray, in western Germany.....(n) 940
New York, New Haven & Hartford R. R., Manual-control block-signal system to be replaced by electric automatic system.....(n) 386
Railway signal towermen to remain on duty not more than nine out of 24 hours.....(n) 90
Semaphore signal with illuminated parabolic blade.....*1234
Spacing of distant signals.....(ed) 176
Wireless telegraphy for railway trains; Experimental installation on the Delaware, Lackawanna & Western R. R.....(ed) 1246
Silt, Silting of harbors and effect of piers and jetties upon the movements of sand.....(n) 644
Siphon, Completion of the Los Angeles Aqueduct; Brief description of the works with some reference to the historical details.(lets) 318, 1095

SLAG:
Relative merits of different kinds of slag .....(n) 131
Retaining walls of molten slag at Butte (Mont.) reduction works, (n) 568
Slate, Clarification of sewage in slate beds; Description of construction and operation of slate beds with data concerning their efficiency, Limitations and costs.....*641
Sledge hammers, Sledge for breaking rock, ...(n) 366
Slide rules, Methods of getting fifth root on an ordinary slide-rule....(n) 1309

SMOKE PREVENTION:
Cottrell process, Dust precipitation plant of the Riverside Portland Cement Co., Crestmore, Calif... 716
Smoking on street cars prohibited by Public Service Commission....(n) 386

SNOW FENCES:
American Railway Bridge and Building Association; committee report 889
Reinforced-concrete snow fences used on the Italian State Railways.(n) *615
Society for the Promotion of Engineering Education, Annual meeting, June 24-26..... 46
Society of Naval Architects and Marine Engineers, Annual meeting, New York City, Dec. 11-12.....1255
Sociology, Solving the problem of "human engineering" .....962, (let) 1094
Sounding. (See Surveys and surveying.)

SPECIFICATIONS:
Alloys, Report of committee; American Society for Testing Materials.... 39
Application of specifications; Presidential address before the American Society for Testing Materials. By Robert W. Hunt..... 20
Bonus system for the purchase of portland cement.....281, (ed) 321
Brick, Report of committee; American Society for Testing Materials... 40
Bridge specifications for highway bridges, issued by the United States Office of Public Roads.(n) 507
Cement, Report of committee; American Society for Testing Materials 40
Cleaning water mains at Hartford, Conn., by contract; specifications for. By Caleb Mills Saville.....*1098
Concrete reinforcement from re-rolled rails; Paper at annual meeting of the American Society for Testing Materials .....75, (Erratum) 181

PAGE

SPECIFICATIONS: (Continued)
Concrete, Report of committee; American Society for Testing Materials 40
Copper wire, Report of committee; Annual meeting of the American Society for Testing Materials.... 37
Dry-dock; St. Lawrence River at Levis, Quebec; Dry-dock of record size, built by the Department of Public Works of the Dominion of Canada *1314
Engineers vs. lawyers or progress vs. precedent .....(n) 813
Fixing a basis in advance for comparison of alternate bids.....(ed) 221
Illustrating the need of a code of ethics for engineers.....(ed) 31
Lime, Report of committee; American Society for Testing Materials... 39
Method of specifying proportions of mix for concrete definitely..(n), 722, (let) 1144
New York City's new garbage disposal contract; Contractor agrees to pay city for garbage delivered to certain points of deposit on the waterfront .....267, (ed) 269
New York State highway work.....1203
Paints and painting, Report of committee; American Society for Testing Materials.....39, 76
Rules governing the submission of sewerage and water-supply plans to the New Jersey State Board of Health 548
Sanitary clauses in water-supply construction; Camp Hill View sanitation, Catskill Aqueduct. By Arthur W. Tidd.....*752
Specifications for wrapping steel pipe.*1083
Standard forms, Abstract of paper before American Society of Municipal Improvements..... 776
Standard specifications for waterworks hydrants and valves; American Water Works Association 265
Standard specification for exterior plastering .....(n) 506
Standardization of hose and hydrant connections 289
Steel, Report of committee; Annual meeting of the American Society for Testing Materials..... 37
Wrought iron, Report of committee; Annual meeting of the American Society for Testing Materials.... 37
Sphere, Prismoidal formula applies to the volume of sphere.....(n) 1200
Spikes, Electric tie boring and spiking machine *506
Spirals. (See Railway location; Curves.)
Stables, Effect of stable refuse on concrete. By Benjamin Brooks.(let) *317
Stacks. (See Chimneys.)
Staging, German "ladder" staging.....*606
Statistics. (See also Accident statistics; Population statistics; Vital statistics, etc.)
Steam, Temperature of steam in a superheater .....(n) 253

STEAM SHOVELS:
Rules for laying up idle equipment, Panama Canal..... 820
Track connection device.....(n) *613

STEEL:
Cast-steel dome for the drainage shaft of the Hudson River syphon; Description of and method of manufacture and transportation.*696
Concrete reinforcement from re-rolled rails; Paper at annual meeting of American Society for Testing Materials .....75, (Erratum) 181
Gathmann method of producing sound steel ingots.....*687
Heat-treated steel and alloy steel in locomotive construction; committee report, American Railway Master Mechanics Association.... 30
Influence of copper in retarding the corrosion of steel plate..... 232
Joint railway organization for the inspection of structural steel and steel rails. By A. W. Buel..(let) 86
Largest steel ingot ever cast; Cammel Laird & Co.....(n) 86
Locomotive tires, Report of Interstate Commerce Commission on the derailment near Stockwell, Ind., on Jan. 7, 1913; Cleveland, Cincinnati, Chicago & St. Louis R. R.....1177, (ed) 1195
Observations on bridge expansions; Series of observations of steel railway bridges erected on various lines of the New York, New Haven & Hartford R. R. By H. A. Loser *1170
Paper on heat treatment of steel; Annual meeting of the American Society for Testing Materials..... 74
Rail failures and their causes. By M. H. Wickhorst..... *23
Report of committee; Annual meeting of the American Society for Testing Materials 37

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

STEEL: (Continued)
Re-rolled from old rails for concrete reinforcement ..... (ed) 81
Structural:
Germany's foreign trade in structural steel..... (n) 915
Joint railway organization for the inspection of structural steel and steel rails. By A. W. Buel.. (let) 86
Progress of the Canadian steel industry ..... (n) 925
Steel channel tunnel lining, Elm tunnel; Frankfurt-Berlin railway line, Germany..... *1176
Steel cutting-edges for concrete caissons *1033
Vanadium steel in locomotive construction. By George L. Norris.. 634
(See also Iron and steel.)
Stocks, Federal control of stock and bond issues..... (ed) 935

STONE:
Artificial marble made with white portland cement..... (n) 1260
Production in the United States in 1912 ..... (n) 562
Stone crushers. (See Rock Crushers.)

STRAIN GAGES:
Live-load strain-gage using scissors principle; Designed by J. E. Howard, Bureau of Standards, Washington, D. C..... *701
Strain-gage measurements of stresses in arches..... (n) 1308
Stream gaging. (See River discharge and velocity.)

STREET CLEANING:
Recent progress in methods and character of street cleaning; condensation of a paper presented before the Sanitary Engineering Section of the American Public Health Association at Colorado Springs, Sept. 1913. By S. Whinery 570
Washington, D. C., Street cleaning without contractors; Day labor under the general charge of the Commissioners of the District of Columbia and under the direct charge of a civil engineer; Cost-keeping system; Municipal vs. contract street cleaning..... 681

STREET LIGHTING:
Chicago, Ill., Cost of municipal electric lighting..... 668
Industrial city of Torrance, Calif.; General layout of the city and its various public improvements described. By Ralph Bennett..... *870
Philadelphia, Penn., Street lighting contracts for coming year.... (n) 472
Washington, D. C., Studies in; discussed by W. C. Allen, Electrical Engineer, District of Columbia, (n) 694
Street railway accidents. (See Accidents.)

STREET RAILWAYS:
Brooklyn, N. Y., System of medical inspection for employees..... (ed) 175
Cleveland, Ohio., Arbitration of differences between city and Cleveland Ry. Co. completed and report presented..... (n) 262
Edinburgh, Scotland, Self-propelled street cars recommended for municipal tramways..... (n) 280
Massachusetts, Control of group of electric railways secured by Sanderson & Porter, New York, (n) 323
Motor-omnibus operation; Motor-omnibus as a competitor of the electric street railway; Report by Harry P. Nichols, Chief of the Bureau of Franchises, and John A. McCollum. By Pendleton Dudley.... (ed) 1039, 1087, 1050, 1180, (let) 1321
Overcrowded street cars; Bill proposing that passengers having to stand pay half fare..... (n) 1181
San Francisco, Calif.:
Municipal street-railway lines to furnish transportation for the Panama-Pacific Canal Exposition, (n) 484
Net profit of the municipal railway for six months to July 31, 1913 ..... (n) 484
Smoking on street cars prohibited by Public Service Commission... (n) 386
(See Electric railways.)
Street sprinkling, St. Paul, Minn., Sprinkling and oiling streets; Organization, methods, cost and method of assessing cost..... 295

PAGE

STREETS:
Baltimore, Md., Covering of Jones' Falls; an open creek, taking the drainage of the city's streets and houses, and long notorious as a public nuisance; used as a low-grade street connecting railway stations *2, *927
Control of sidewalk construction and maintenance 778
Crown of. (See Pavements.)
Excessive street widths..*1134, (ed) 1139
Hamburg, Germany, Tunnels under the Elbe. By L. F. Bubendey.... *189
Industrial city of Torrance, Calif.; General layout of the city and its various public improvements described. By Ralph Bennett..... *870
London, England, Motor-omnibus accidents. By H. Raynar Wilson.... 550
Protecting street traffic from falling objects during building construction *358
Street collapse, Randolph St., Chicago, Ill., opposite a new 12-story extension of the Marshall Field dry-goods store..... *1206
Use of, by the motor-omnibus... (ed) 1039, 1050, 1087, (let) 1321

STRESSES:
Arch, Question of stability. By J. H. Gandolfo..... (let) *372
Chart for determining the section moduli of floor beams..... *174
Clearness in teaching mechanics.. (ed) 421
Combination concrete and cast iron for columns and arch ribs..... *864
Dams, Neglected first principles of masonry dam design.. (lets) *442, 623, 832
Diagram for projecting edges of steel bearing-plates *1033
Equivalent uniform loads on bridges for different types of engine..... *824
Failure of the Stark-Lyman Building, Cedar Rapids..... *1104, 1254
General method for drawing influence lines for stress in simple trusses. By C. A. Melick..... (let) *129
Graphical method for dividing the neutral axis of an arch.... (n) *1310
Graphical method of dividing neutral axis in concrete arch design. By T. A. Smith..... *611, (n) 822
Least radius of gyration; Short cut to 360
Live-load strain-gage using scissors principle; Designed by J. E. Howard, Bureau of Standards, Washington, D. C..... *701
Loading formulas for crane-girders, (ns) 815, 1036
Municipal building laws in the United States; a study of the building codes of the leading cities in the United States. By R. Fleming.. 9
Ordish truss bridge being reinforced, Philadelphia, Penn. By Henry H. Quimby *487
Partial failure of a light highway bridge. By F. Tissington..... *904
Shear and rivet diagram for railway plate-girders *823
Strain-gage measurements of stresses in arches ..... (n) 1308
Stresses in a reinforced-concrete floor slab under heavy load; new freight terminal of the Minneapolis, St. Paul & Sault Ste. Marie Ry. in Chicago..... (n) 869
Timber, What is a proper safe stress for timber?..... (lets) 179, 426
Unit stresses in timber. By Arthur T. North..... (let) 426
Unusual girder work in the Sheridan Square Theater, Pittsburgh, Penn. *1230

STRIKES:
Influence of petty pay-roll economies on labor conditions. By T. N. Ashton ..... (let) 567
Unfairness of organized labor. By W. J. Knight..... (let) 672

STRUCTURAL DESIGN:
Chart for determining the section moduli of floor beams..... *174
Construction and use of empiric formulas. By Cyrus T. Brady, Jr.... *163
Design of standard reinforced-concrete retaining walls. By H. M. Gibb, *170, (n) 274
Diagram for projecting edges of steel bearing-plates *1033
Dome of the Wisconsin capitol: Steel tower which forms the support or substructure of the dome, rising from the foundations and carrying the dome independently of the main portion of the building..... *389
Equivalent uniform loads on bridges for different types of engine..... *824
General method for drawing influence lines for stress in simple trusses. By C. A. Melick..... (let) *129
Graphical method of dividing neutral axis in concrete arch design. By T. A. Smith..... *611, (n) 822

PAGE

STRUCTURAL DESIGN: (Continued)
Least radius of gyration; Short cut to 360
Shear and rivet diagram for railway plate-girders *823
Some necessary precautions in the design and supervision of construction of low-truss steel highway bridges. By G. M. Braune..... 398
Steel chimney 400 ft. high of the United Verde Copper Co., Jerome, Ariz. By C. W. Cromwell..... *1114
Steel guyed derricks for building erection *1028

STRUCTURAL DETAILS:
Bridge over the Rhine at Cologne. By Charles J. Kavanagh..... *845
Colorado Street reinforced concrete arch bridge over the Arroyo Seco, Pasadena, Calif..... *146
Framing of gas-engine-driven barges; Alabama & New Orleans Transportation Co..... *1109
Guaranty Trust Co.'s new building, New York City; Interesting problems in the foundations and steel construction. By Eugene W. Stern *258
Large arch-truss drill-hall; Roof carried by a series of three-hinged arch trusses of novel design and construction; Armory for the University of Illinois, Urbana, Ill., *1182
Office building of the Consolidated Gas Co., New York City; Details of unusual features; Construction methods, etc..... *1275
Structural features of a Chicago, Ill., bank building; Continental & Commercial National Bank Co..... *976
Truss in United States Custom House, Boston, Mass.; Large building truss ..... (n) *1036
Unusual girder work in the Sheridan Square Theater, Pittsburgh, Penn. *1230
Stucco, Standard specification for exterior plastering..... (n) 506

SUBWAYS:
Boston, Mass., New subway under construction *1190
Chicago, Ill.:
Harbor and subway plans..... 395
Present status of the subway situation. By William J. Shanks..... 1044
New York City:
Aggregate cost of new rapid transit lines under construction..... (n) 90
Center Street Loop line opened Aug. 4 ..... (n) 276
Crash in subway Dec 4..... (n) 1208
Harlem River crossing of Lexington Ave. subway..... (n) 716
Progress on subway construction to date ..... (n) 947
Protecting plate-glass windows against blasting operations..... 1303
Summary of traffic on the city subway and the Manhattan and Bronx elevated railroads..... (n) 865
Very large contract on a cost-plus-a-percentage basis pending between the Interborough Co. of New York City and John F. Stevens ..... (n) 249
Paris, France:
Decision on subway construction damages ..... (n) 675
Difficult tunnel work on the Metropolitan Ry.; Tunnels through underground quarries; tunnel of unsymmetrical section; tunnel supporting bridge piers..... *504
Sun, Shuman-Boys sun-power plant, Cairo, Egypt, to be tested.... (n) 228
Sun power, Solar power plant put in operation at Meadi, near Cairo, Egypt ..... (n) 865

SUPERHEATED STEAM AND SUPERHEATERS:
Superheaters to be applied to locomotives on New York, New Haven & Hartford R. R..... (n) 234
Temperature of steam in a superheater ..... (n) 253
Surveying, Quantity surveying in the United States. By Leslie H. Allen (ed) 887, (let) 988

SURVEYING INSTRUMENTS:
Plumb line target..... (n) *365, 613
Plumb-bob holder on the leg of a tripod ..... (n) *1035
Surveying instruments from a British standpoint ..... (n) 366

SURVEYS AND SURVEYING:
Camps, Canadian Northern Ry. surveys; Equipment and camp outfit. By Henry K. Wicksteed..... 72

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

SURVEYS AND SURVEYING: (Cont.)
Canadian Northern Ry., Describes new line between Montreal and Port Arthur; Description of exploration and survey work through a difficult and almost unknown and inaccessible region. By Henry K. Wicksteed *68
Cincinnati, Ohio, Instructions to field parties for the subsurface survey of Cincinnati, Ohio..... *1080
Desirability of establishing quantity surveying in the United States. By Leslie H. Allen. (ed) 877, (let) 988
Establishing a uniform city datum by precise level methods.....(ed) 468
Generosity of old-time surveyors..(n) 560
Hydrographic:
Hydrographic surveying; Oakland Harbor development, California. By Fred W. Johnson..... *362
River ferry as a stream-gaging station, on the John Day River in Oregon; U. S. Geological Survey. B. W. C. Sawyer..... *610
Instructions to field parties for the subsurface survey of Cincinnati, Ohio *1080
Leveling:
Accurate method of leveling with a Wye level.....(Erratum) 131
Precise leveling in New York City; Organization and methods of the work, method of computation, of reciprocal leveling for river crossings, and the whole procedure in both field and office operations. By Frederick W. Koop. *446, (ed) 468
Manual signals for field engineers, *360, (n) *613
Old surveyor's latest solar observation; Street in Washington, D. C., laid out in true meridian. By A. W. Barber .....(let) 936
Plumb line target.....(n) *365, 613
Question whether a city engineering department should do city surveying for private parties in competition with private engineers...(n) 228
Results of a personal investigation of the holders of the offices of County Engineer and County Surveyor in the State of Kansas. By J. W. Mavity .....1189, (ed) 1196
United States Geological Survey topographic maps for the civil and mining engineer. By E. G. Woodruff 384
Water-waste and pitometer surveys in Philadelphia. By John S. Ely. (ed) 669, *676
Weighing the plot as a means of measuring land areas.....(n) 172

SWITCHES:
Improved slip-switch crossings; Pennsylvania R. R..... *254
Renewing switches with wrecking cranes on the Philadelphia & Reading Ry.....(n) 981

T

Tables, Convenient earthwork table. By Philip B. Hill..... *825

TANKS AND STANDPIPES:
Reinforced concrete double-deck water tank of unusual design built at plant of the Burson Knitting Co., Rockford, Ill..... *158
Reinforced-concrete water tank with a sliding joint..... *1204
(See also Gas-holders.)
Tar, pavements. (See Pavements.)
Taxes, Some reasons for the increase in public debt and the raising of tax rates .....(ed) 221
Technical League, Chicago Technical League. By Louis A. Heyn. (let) 1143
Technical societies. (See Engineering societies.)

TELEPHONY:
Chicago, Ill., Valuation of telephone companies .....(ed) 31
Submarine telephone cable 33 miles long between Vancouver Island and British Columbia.....(n) 518
Temperature, Utilizing low-grade temperature drops as a source of power .....(ed) 270
Teredo. (See Piles.).
Terra-cotta, Fire, load and water test upon cinder-concrete, terra-cotta and gypsum floor arches. By Harold Perrine..... *374

TESTING MACHINES:
Large testing machines and government work in testing materials, (ed) 564
Prussian Government 3300-ton testing machine at Berlin....*537, (ed) 564

PAGE

TESTS AND TESTING:
Action of alkali and sea water on concrete; U. S. Bureau of Standards report 50
Action of various substances on cement mortars. By Richard K. Meade.. 21
American Society for Testing Materials; paper at annual meeting.. 76
Cast iron, Uniform test bars for cast iron .....(n) 1011
Cast-steel dome for the drainage shaft of the Hudson River siphon; Description of and method of manufacture and transportation..*696
Cement. (See Cement testing.)
Concerning engineering research—the useless and the useful. By E. A. Moritz.....(ed) 32, (let) 129
Conclusions from tests on the influence of vibration on magnetic properties .....(n) 635
Damage to bulk cement and sacked cement by wetting in transit. By J. H. Libberton..... 251
Experiments on uplift pressure in masonry dams.....*202, (let) 371
Fire, load and water test upon cinder-concrete, terra-cotta and gypsum floor arches. By Harold Perrine. *374
Floors, Stresses in a reinforced-concrete floor slab under heavy load; new freight terminal of the Minneapolis, St. Paul & Sault Ste. Marie Ry. in Chicago.....(n) 869
French naval laboratory to be opened at Savranlivry, France.....(n) 1192
Heaving of wood-block pavement under extreme climatic conditions, Longview, Tex., by H. N. Roberts and P. E. Green.....*1134, (ed) 1139
Hydraulic laboratory for irrigation investigations, Fort Collins, Colo.; Irrigation investigations of the Office of Experiment Stations, U. S. Department of Agriculture and Colorado Experiment Station. By V. M. Cone.....*662
Influence of copper in retarding the corrosion of steel plate..... 232
Internal temperature range in concrete arch rings.....(n) 174
Investigation of existing engineering structures. By Horace R. Thayer 609
Investigation of the strength of cinder concrete *722
Large testing machines and government work in testing materials, (ed) 564
Manufacturer's hydraulic laboratory at the works of the Wheeler Condenser & Engineering Co. at Carteret, N. J. By P. A. Bancel....*916
Mexican Northern Power Co., Chihuahua, Mex.; Use of hydraulic lime for a masonry dam. By Guy S. Newkirk 19
Notes on the construction of a large earth dam; Somerset, Vt.....*1300
Observations on bridge expansions; Series of observations of steel railway bridges erected on various lines of the New York, New Haven & Hartford R. R. By H. A. Loser *1170
Pumps; Tests of automobile pumping engines under the direction of the Committee on Exhibits, International Association of Fire Engineers, New York City.....(n) 659
Rail failures and their causes. By M. H. Wickhorst..... *23
Rails; Rail broken in fourteen places; Report recently issued by the engineer-physicist of the United States Bureau of Standards on a train derailment on the Louisville & Nashville R. R. near Hays Mills, Ala., Oct. 1, 1912.....*604
Rate of corrosion of metal; paper at annual meeting of the American Society for Testing Materials.... 74
Recent investigations of the bactericidal, deodorizing and physiologic action of ozone. By W. H. Thompson. (ed) 1092, 1096, (let) 1319
Sand, New method of testing....(n) 173
Steel, Heat treatment of steel; Annual meeting of the American Society for Testing Materials..... 74
Strain-gage measurements of stresses in arches .....(n) 1308
Studies at the Lawrence Experiment Station upon the disposal of sewage sludge in deep tanks..... 13
Tests of oil-burning locomotives to be made by Indian government on North-Western State Ry.....(n) 409
Tests of pressure on wet concrete. By E. B. Germain.....*294
Tests of the direct-acting explosion pumps (Humphrey design), at Chingford, England.....(n) 1331
Tests on the strength of adobe brick, (n) 1035
Thermal testing plant at the Pennsylvania State College. By J. A. Moyer 695
Venturi meter coefficients; Discussion of.....198, (lets) 200, 674

PAGE

TESTS AND TESTING: (Continued)
Work in nonferrous metals at the Bureau of Standards; Extracts from a paper by Dr. G. K. Burgess, Chief of the Division of Metallurgy, Bureau of Standards, before the American Institute of Metals 805

THEATERS:
Marietta, Ohio, Floor collapsed, July 26 .....(n) 276
Pittsburgh, Penn., Unusual girder work in the Sheridan Square Theater.*1230
Thermal conductivity, Theory of the penetration of heat in solid materials. By L. R. Ingersoll..... 866
Thermodynamics, Thermal testing plant at the Pennsylvania State College. By J. A. Moyer..... 695
Thermoscopes, New automatic fire alarm device; described by F. A. J. Fitzgerald in the November "Journal" of the Franklin Institute....(n) 1291

TIES:
Electric tie boring and spiking machine *506
Hardwood ties on the Panama R. R.; Remarkably long service.....1166
Railway tie purchases in New England during the past year by the New York, New Haven & Hartford R. R.....(n) 503
Spacing of, Walking on railway track should be discouraged.....(n) 626
Steel: Steel channel ties for mine tracks with spring clip fastenings *100
Untreated hemlock and tamarack railway ties .....(n) 430

TILE:
Drain tile (See Pipe, Clay.)
Tile protection for intertidal concrete in sea walls.....*1178

TIMBER:
Diminishing timber supply and municipal forests .....(ed) 469
Effect of chestnut blight on timber, (n) 111
Effect of forest fires on standing hardwood timber.....(n) 191
Expansive power of water-soaked wood .....(n) *615
Forest products in 1912; United States Bureau of the Census..(n) 495
Lower prices promised for lumber.. 891
Proposed reforestation of the Cedar River watershed, Seattle, Wash.*480
Stress, What is a proper safe stress for timber? .....(lets) 179, 426
Unit stresses in timber. By Arthur T. North .....(let) 426

TIMBER PRESERVATION:
Condition of experimental telegraph poles, treated and untreated, after eight years' service. By C. H. Teesdale *1084
Early objection to wood-block pavements and an early argument for timber preservation 1076
Hardwood ties on the Panama R. R.; Remarkably long service.....1166
Heaving of wood-block pavement under extreme climatic conditions, longview, Tex., by H. N. Roberts and P. E. Green..*1134, (ed), 1139, (let) *1315
Preservative treatment of poles; Abstract of a paper read at the annual convention of the National Electric Light Association. By Russell A. Griffin..... 61
Tires, Simple rule for inflating pneumatic tires .....(n) 659
Torrance, Calif., Industrial city of Torrance, Calif.; general layout of the city and its various public improvements described. By Ralph Bennett *870
Torsion power meters, Visible scale for torsion power meters.....(n) 1194
Town planning. (See City planning.)

TRACK:
Annual convention of the Roadmasters and Maintenance-of-Way Association, Chicago, Ill., Sept. 9-12.... 596
Austrian rail joint of the wedge type, manufactured by Schelnig & Hofman, Linz, Austria.....*655
Cleaning stone ballast by screening; Experiments with screens instead of forks for cleaning, on the Baltimore & Ohio R. R. in 1912. By W. I. Trench.....*453
Electric railway, Electric rail-grinding machine *1181
Electric tie boring and spiking machine *506
Field glasses for track inspection used on Prussian State Railway....(n) 173
Gage, Railway curve formulas; Formulas for swing of locomotive truck. By Kenneth McIntosh.....(let) 673

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

TRACK: (Continued) PAGE
Handling rails and heavy track material by machinery. By W. E. Davin 611
Improved slip-switch crossings; Pennsylvania R R. *254
Organization for track-elevation work.*1307
Rail-handling machine for rail renewals *1032
Railway tie purchases in New England during the past year by the New York, New Haven & Hartford R. R. .....(n) 503
Renewing switches with wrecking cranes on the Philadelphia & Reading Ry. .....(n) 981
Reverse-curve crossover with unequal frogs. .....(ns) *172, *364
Solution of a special problem in reverse curves .....(n) 173
Steam shovels used in track connection. (n) *613
Steel channel tie for mine tracks, with spring clip fastenings. *100
Street railway:
Easement curves for street-railway track .....(n) 1035
Electric welding for track repairs and rail joints. *298
Methods of paving street railway tracks; Brick paving with asphalt flangeways at Tulsa, Okla.; Concrete paving at Texarkana, Tex.-Ark *1229
Track inspection car; Erie R. R.; Dynagraph or track-inspection car, which detects irregularities and imperfections; autographic records of track conditions in diagram form *660
Transandean Railway from Arica, Chile, to La Paz, Bolivia; 459-km. (144-mi.) meter-gage railway, with a 24-mi. rack section, 11,800 ft. above sea-level. By B. H. Sawyer *1059
Walking on railway track should be discouraged .....(n) 626

TRACK ELEVATION:
Chicago, Ill., Track elevation and portable concreting plant; Chicago, Milwaukee & St. Paul Ry., *26, (n) 365
Organization for track-elevation work.*1307
Pennsylvania R. R., Grade elevation and six-tracking at Rahway, N. J. By John Jervis Vail. *1118

TRACK SCALES:
American Railway Bridge and Building Association; committee report 891
Interstate Commerce Commission's report on railway-track scales. 322
Trade wastes. (See Manufacturing wastes.)

TRAINS:
Benzol-electric motor train built for the Khedive of Egypt. .....(n) 710
Concreting train using a drag-line excavator .....1031, (let) 1198
New train schedule for 1300 trains for New York, New Haven & Hartford R. R. Oct. 5. .....(n) 733
Public-health exhibit train run through Michigan .....(n) 162
Wireless telegraphy for railway trains; Experimental installation on the Delaware, Lackawanna & Western R. R. .....(ed) 1246
Trainsheds, Repairing the trainshed of the Union Station at Chicago. .(n) 361
Transits, Plumb-bob holder on the leg of a tripod. .....(n) *1035

TRANSPORTATION:
Around the world in 35 days; J. H. Mears, representative of New York "Evening Sun" .....(n) 324
Boston, Mass., New subway under construction *1190
Canada, Sir William Van Horne, criticism of. .....(ed) 1311
Car-float service on the Chicago River. (n) 574
Cement, Damage to bulk cement and sacked cement by wetting in transit. By J. H. Libberton.... 251
Chicago, Ill.:
Arnold report on the Chicago terminal situation. *1154
Present status of the subway situation By William J. Shanks. 1044
Suggested changes in railway terminals; Extract from a report by John F. Wallace to the Committee on Railway Terminals of the City Council of Chicago. .923, (let) *1154
Cost of operation of 5-ton motor trucks .....(n) 338
Efficiency engineering achievements in the railway service. .....(ed) 1245
Electric carrier railways for rapid transfer of mail and express; Experimental plant at Paterson, N. J. System of American Pneumatic Service Co. and Cambridge demonstration plant. *637, *702

TRANSPORTATION: (Continued) PAGE
Inland navigation barges with producer-gas engines; Alabama & New Orleans Transportation Co. to operate between the coal fields of Alabama and the city of New Orleans *1109
Motor-omnibus operation; Motor omnibus as a competitor of the electric street railway; report by Harry P. Nichols, Chief of the Bureau of Franchises, and John A. McCollum. By Pendleton Dudley. ..(ed), 1039, 1050, 1087, 1180 (let) 1321
Overcrowded street cars; Bill proposing that passengers having to stand pay half fare. .....(n) 1181
Pittsburgh Auto Transit Co., Pittsburgh, Penn.; 34-passenger single-deck motor omnibus. *1
Remarkable survival of the inclined plane, Mahanoy, Penn.; Philadelphia & Reading Ry. By Joseph S. Ward. .....*1220, (ed) 1247
State purchase of railways in Great Britain. By H. Raynar Wilson. 1117, (ed) 1140
Trackless-trolley motor for assisting haulage on a steep-grade street. By J. P. Schroeter. *253
Traveling sewage distributor, Sewage treatment works with motor-driven reversible distributor, Springfield, Mo. *1112
Tremies, Planer shavings and cement used as a plug in tremies for depositing concrete under water. .....(n) 1027
Truck driven from Valdez to Fairbanks, Alaska .....(n) 732

TRESTLES:
Construction trestles with old rails for stringers. *814
Dardanelle & Ola R. R., Wooden trestle collapsed, Centerville, Ark., Nov. 17 .....(n) 1107
Railway trestle set on fire by short-circuit on car of Brooklyn Rapid Transit Co., June 29. .....(n) 90
Timber trestle 3500 ft. long and varying from 30 to 40 ft. in height across Newark Bay, in New Jersey, rebuilt in eleven days and six hours .....(n) 168
Triangulation. (See Surveys and surveying.)
Trigonometry, Two sides and included angle formula. .....(n) 1310
Troy, Ohio, Report on flood protection by the Morgan Engineering Co. *1292

TRUSSES:
Arch-truss drill-hall; Roof carried by a series of three-hinged arch trusses of novel design and construction; Armory for the University of Illinois, Urbana, Ill. .*1182
General method for drawing influence lines for stress in simple trusses. By C. A. Melick. .....(let) *129
Ordish, Reinforcing an old cantilever bridge, Philadelphia, Penn. By Henry H. Quimby. *487
Some necessary precautions in the design and supervision of construction of low-truss steel highway bridges. By G. M. Braune. 398
Truss in United States Custom House, Boston, Mass.; Large building truss .....(n) *1036
(See also Bridges; Roofs; Stresses.)

TRUSTS:
Decentralizing great organizations. .....(ed) 770
Unfairness of organized labor. By W. J. Knight. .....(let) 672
Tube automatic railways, Electric carrier railways for rapid transfer of mail and express; Experimental plant at Paterson, N. J. System of American Pneumatic Service Co. and Cambridge demonstration plant *637, *702
Tungsten, Half-watt tungsten-filament electric lamp. .....(ed) 717, 724

TUNNEL LINING:
Concreting a tunnel by compressed air; Kansas City Terminal Ry., Kansas City, Mo. By A. C. Everham. ..*208
Repair of an old brick tunnel lining; Reinforcing and waterproofing the double-track Honebach tunnel, Germany. By F. Lavis. .(let) 623
Steel channel tunnel lining, Elm tunnel; Frankfurt-Berlin railway line, Germany. *1176
Waterproofing or drainage of tunnel arching? By F. Lavis. .....(let) 623
Tunnel shields, Large tunneling shield; Steel channel tunnel lining, Elm tunnel; Frankfurt-Berlin railway line, Germany. *1176

TUNNELS AND TUNNELING: PAGE
Alps Mountains:
Construction of the second Simplon tunnel progressing rapidly. ....(n) 946
Electrification of the St. Gotthard Railway 1159
Mont D'Or tunnel holed through Oct. 2. .....(n) 892
Work delayed on Grenchenburg tunnel .....(n) 946
Baltimore, Md., Covering of Jones' Falls; an open creek, taking the drainage of the city's streets and houses, and long notorious as a public nuisance; Used as a low-grade street connecting railway stations *2 *927
Brussels, Belgium, New railway stations and six-track tunnels. *160
Carolina, Clinchfield & Ohio Ry., Railway construction through "the Breaks" in the Pine Mountain range (Cumberland Mountains); Kentucky-Virginia. By O. K. Morgan *762
Catskill Aqueduct, Hudson River crossing, Cast-steel dome for the drainage shaft of the Hudson River siphon; Description of and method of manufacture and transportation *696
Device for measuring the inflow of water into shafts. .....(n) *1308
Difficult tunnel work on the Metropolitan Ry. of Paris, France; Tunnels through underground quarries; Tunnel of unsymmetrical section; tunnel supporting bridge piers *504
Elm tunnel, Germany, Large tunneling shield; Steel channel tunnel lining; Frankfurt-Berlin railway line *1176
Hamburg, Germany, Tunnels under the Elbe. By I. F. Bubendey. *189
Idaho Northern Ry., Extension of 103 miles from Emmett north to Big Lafayette Lake. By J. H. Smith. *101
Kansas City, Mo., Concreting a tunnel by compressed air; Kansas City Terminal Ry. By A. C. Everham. *208
Montreal, Que., Remarkable feat in railway construction and development; Canadian Northern Railway 3-mile tunnel through Mount Royal By S. P. Brown. *62, (n) 1260
New York City:
Astoria tunnel of the Consolidated Gas Co. under the East River. By Harold Carpenter *737
Harlem River crossing of Lexington Ave. subway. .....(n) 716
Headings of Catskill Aqueduct tunnel under East River met Sept. 27 .....(n) 733
New East River Tunnel holed through July 17. .....(n) 185
New York rules governing mine, tunnel and quarry work. .....(ed) 563
North Poudre Irrigation Co. tunnel completed Nov. 13. .....(n) 1159
Obstinate railway tunnel fire in California; Santa Margarita tunnel of the Southern Pacific Co. 1234
Pennsylvania R. R.; Bergen Hill Tunnels, N. J., Waterproofing or drainage of tunnel arching? By F. Lavis. .....(let) 623
Philadelphia and Camden Tunnel under Delaware River a probability. (n) 1107
Railroad tunnel collapsed near Chemnitz, Germany, Dec. 15. (n) 1259
Repair of an old brick tunnel lining; Reinforcing and waterproofing the double-track Honebach tunnel, Germany. By F. Lavis. ..(let) 623
Snoqualmie tunnel on line of Chicago, Milwaukee & Puget Sound Ry. making good progress. .....(n) 865
Willamette Pacific R. R., Tunnel 2480 ft. long, pierces the Coast Range Mountains between the Willamette Valley and the Siuslaw River. 957

TURBINES:
Hydraulic:
Problem of finding the proper turbine capacity to be installed at a water-power site. ..*462, (let) 674
Swiss hydro-electric station using water under 2800-ft. head. *52
Turbines of the Mississippi River Power Co. at Keokuk, Ia. .*340, *342
Steam:
Parsons steam-turbine generating unit; 33,500-hp. British-built steam turbine of the Commonwealth Edison Co., Chicago, Ill. .*940
Steam turbine generating units; 30,000-kw.; Interborough Rapid Transit Co. of New York City. (n) 324, *428
Turbine of 40,000-hp. to be erected in Hagen electric power station, Westphalia, Germany. .....(n) 100
Turnouts. (See Track.)
Turntables. (See Railway structures.)

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

TYPHOID FEVER:
Lessons from a probable water cress typhoid outbreak.....(ed) 311, *322
New York City, Typhoid fever deaths in second quarter of 1913....(n) 343
Philadelphia, Penn., Dual water-supplies and typhoid fever.....1022
Richmond, Va., New water purification scheme proposed.....(n) 87
Typhoid fever in large American cities; Decrease very marked in recent years; Betterment of public water-supplies. By George A. Johnson, *473, (erratum) 567

U

United States Good Roads Association, More agitation for federal aid to highway construction. By R. B. Wheeler .....(ed) 986, (let) 1094

UNITED STATES:
Increase in the foreign trade of the United States.....(n) 297
Should the United States participate in international congresses?..(ed) 176
United States Board of River Regulation, Proposed, Ambitious river regulation plan, in a bill introduced in the Senate of the United States by Senator Newlands of Nevada, (ed) 470
United States Bureau of Standards, Large testing machines and government work in testing materials...(ed) 564

UNITED STATES FOREST SERVICE:
Development of water power in the national forests..... 573
Power development in U. S. forest reserves being greatly increased.(n) 324
Receipts from national forests of the United States for year ended June 30, 1913.....(n) 283

UNITED STATES GEOLOGICAL SURVEY:
Artificial controls for stream gaging stations; Small barriers of concrete or of rubble leveled off with cement-mortar; Types of artificial barriers and rating curves for each type. By G. S. Strout.....(let) 226
Topographic maps for the civil and mining engineer. By E. G. Woodruff 384
United States Good Roads Association, Convention at St. Louis, Mo., Nov. 10-14 .....(n) 1056
United States Public Health Service, Employment of engineers in..(ed) 1245
United States Public Works Department, Resolutions adopted by American Road Congress at Detroit....(n) 780

UNITED STATES RECLAMATION SERVICE:
Boise Project, Mill flume having 100-sec.-ft. capacity. By F. W. Hanna *1077
Building charge on land of Huntley irrigation project fixed by Secretary of the Interior.....(n) 661
Comments by Secretary Lane on conservation; Annual report of the Secretary of the Interior....(ed) 1312
Coöperation in irrigation work between state and federal governments.(n) 115
Cost of irrigation works per acre supplied with water..(let) 128, 348, (let) 354, (ed) 987
Electric power to be used exclusively for construction work on the Sun River Irrigation Project.....(n) 1259
Government irrigation work; Extract from the annual report of the Secretary of the Interior to Congress. By Franklin K. Lane.1322
Important Reclamation Service decision which establishes once for all the legality of the maintenance charge, (ed) 125
Independent opinion on the United States Irrigation Service....(ed) 987
Irrigation water-supply for the Pima Indians. By Arthur P. Davis...*956
United States Waterways Commission, Proposed, Ambitious river regulation plan, in a bill introduced in the Senate of the United States by Senator Newlands of Nevada, (ed) 470

V

VACUUM PUMPS:
Design for low-service rotary vacuum and air-compressor pumps; Nash low-service air pump.....*1010
Rotary high-vacuum air pump; Thyssen design.....*1125
Valuation engineering. (See Building valuation; Public service corporations; Railway valuation; Water-works valuation.)

PAGE

VALVES:
Power plant designed as a house of cards; Pioneer Station of the Utah Light and Railway Co., Ogden ....(ed) 985, (ns) 990, 1055
Pump-valve seat which rotates its valve to produce uniform wear; Boyd turbine valve-seat.....*909
Standard specifications for water-works hydrants and valves; American Water Works Association..... 265
Vaults, Bank vault of the Guaranty Trust Co. of New York City.....*262
Ventilation. (See Heating and ventilation; Blowers.)

VIADUCTS:
Chicago, Ill., Shifting the girders and columns of the Chicago Elevated Railway *906
Nashville, Chattanooga & St. Louis Ry., Grade reduction and double tracking *802
Replacing a timber Howe truss with a long-span plate-girder; Bad River crossing, Duluth, South Shore & Atlantic Ry., near Shilo, Wis...*1303
Richmond, Va., James River, Needed reform in the conduct of engineering competitions...(ed) 311, (n) 324
St. Louis, Mo., Carondelet Park bridge; Flat circular reinforced-concrete arch supported by cellular abutments with spread footings; Approach retaining walls; Railways; monumental pylons, cornices and railings embellishing the structure. By Charles W. Martin.....*646
Spokane, Wash., Self-draining foundation pit on the bank of a river; Excavation of piers at the Oregon-Washington R. R. & Navigation Co.'s viaduct across the Spokane River, Spokane, Wash. By John W. Cunningham.....*1024
Switzerland, Halen reinforced-concrete bridge, Bern; Main arch 286-ft. span *531
Vancouver, B. C, Georgia-Harris viaduct; a succession of concrete-encased steel Warren trusses, "mushroom" slabs, reinforced-concrete girders and steel-frame cantilevers; designed by C. A. P. Turner *344

VITAL STATISTICS:
Typhoid fever deaths in New York City for second quarter of 1913, (n) 343
Typhoid fever in large American cities; Decrease very marked in recent years; Betterment of public water-supplies. By George A. Johnson, *473, (Erratum) 567
Volume, Prismoidal formula applies to the volume of sphere.....(n) 1200

W

Wages, Influence of petty pay-roll economies on labor conditions. By T. N. Ashton.....(let) 567

WALLS AND BINS:
Collapse of a thin partition wall in water-works settling basin. By Walter R. Mason...*1049, *1179, (let) 1321
Cutting an expansion joint in a concrete wall.....(n) 1308

WARSHIPS:
"Arkansas", Injury to the hull of.... *439
Battleship "Oden" struck gunboat "Urd" off Swedish coast.....(n) 434
Boiler explosion on U. S. Destroyer "Craven", Sept. 10.....(n) 635
Contracts for the construction of six destroyers awarded.....(n) 635
Washington, D. C., Street cleaning without contractors; Day labor under the general charge of the Commissioners of the District of Columbia and under the direct charge of a civil engineer; Cost-keeping system; Municipal vs. contract street cleaning..... 681

WATER:
Calculation of water-hammer pressures. By S. L. Berry.....(let) 1144
Cause of "red water".....(n) 1117
Device for measuring the inflow of water into shafts.....(n) *1308
Duty of, Study of irrigation heads in the Modesto and Turlock irrigation districts, California..... 502
Experimental work in the investigation of a method of removing colloidal clay from the water-supply of the city of Buenos Aires, Argentina. 15
Tropical seas, Neglected source of power in nature..250, (ed) 270, (let) 425
Utilizing water to produce nitrates for fertilization .....(n) 1052

PAGE

WATER ANALYSIS:
Paper on gelatin and agar bacterial counts for controlling filter operation; Annual convention of the American Water Works Association 44
Shipping outfit for iced-water samples.*819
Water Consumption. (See Water waste.)
Water cress, Lessons from a probable water cress typhoid outbreak, (ed) 311, *322
Water famines, Columbus, Ohio, Water shortage caused by large water main, Dec. 6.....(n) 1208
Water filtration. (See Water purification.)

WATER HAMMER:
Calculation of water-hammer pressures. By S. L. Berry.....(let) 1144
Diagram for computing water-hammer pressure. By Frank H. Carter..*616
Pulsograph; a new device for locating leaks in water mains.....*515
Water-heating attachment for concrete mixers .....(n) *1308

WATER MAINS:
Bending 19-in. cast-iron pipe; Preston, Cuba, water supply.....(n) 173
Calculation of water-hammer pressures. By S. L. Berry.....(let) 1144
Cleaning water mains at Hartford, Conn., by contract specifications for. By Caleb Mills Saville....*1098
Diagram for computing water-hammer pressure. By Frank H. Carter..*616
Instructions to field parties for the subsurface survey of Cincinnati, Ohio *1080
Insulating wrappings for large water mains *1083
Philadelphia, Penn., 30-in. water main burst, July 20.....(n) 234
Prevention of the corrosion of iron water mains; Abstract of paper at the annual meeting of the American Public Health Association at Colorado Springs, September, 1913 570
Unusual features of a 48-in. cast-iron water main across a salt marsh to Atlantic City, N. J. By T. Chalkley Hatton.....*1046
Water shortage in Cincinnati, Ohio, caused by large water main, Dec. 6 .....(n) 1208

WATER METERS:
Australian water meter for irrigation supplies; devised by J. S. Dethridge, of Melbourne.....*1283
Baltimore, Md., Need for water meters, (ed) 1091
Care and maintenance of meters and the effect on revenue. By A. W. Cuddeback 569
Device for measuring the inflow of water into shafts.....(n) *1308
Economics of the water meter; Extract from a paper on "The Chicago Water Works." By John Ericson 1235
Venturi meter coefficients; Discussion of .....198, (lets) 200, 674
(See also Water waste.)

WATER POLLUTION:
Auburn, N. Y., Water and air movement in relation to the contamination of the lake water-supply.... 356
Committee reports on sewerage and sewage disposal and on river cleaning; American Public Health Association 759
Discharge of Passaic Valley sewage into New York Bay.....(n) 434
International investigation of the pollution of boundary waters between the United States and Canada, (ed) 669
Sanitary protection of drilled wells, (n) 376
Studies of river bottoms at Philadelphia in relation to sewage disposal *918
Treatment of sewage discharged into tidal waters; Anomalies in sewage-treatment requirements for various municipalities on the River Thames, England..... 401

WATER POWER:
Application of the flow-summation curve to problems of stream regulation and storage. By E. Clinton Jansen *1290
Comments by Secretary Lane on conservation; Annual report of the Secretary of the Interior....(ed) 1312
Determining power possibilities on a watershed; Methods of constructing curves, requisite to the power determination. By Lyle A. Whitsit *496
Development of water power in the national forests..... 573

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

WATER POWER: (Continued) PAGE

Effect of proposed storage reservoirs on stream flow and water power on the Lower Chippewa River, Wis. By Clinton B. Stewart....*246
Federal power over public lands held supreme over state jurisdiction, (n) 1260
Germany, State hydro-electric power system to be built in Prussia..(n) 483
Keokuk, Iowa:
Turbines of the Mississippi River Power Co.....*340
Turbine runners of the Mississippi River Power Co. By H. B. McDermid *342
National or state control of the gifts of nature; National Conservation Congress. By Clarence T. Johnson, (ed) 1092, 1106, (lets) 1199, (n) 1316
Northwestern Electric Co., White Salmon River power development; probably the largest wood-stave pipe yet built.....*685
Pelton type, 19,000-hp. vertical-shaft water-wheel under 1015-ft. head.*124
Permit for power development on the Pend d'Oreille River, Wash., granted International Power & Mfg. Co.....(n) 324
Power development in United States forests reserves being greatly increased .....(n) 324
Problem of finding the proper turbine capacity to be installed at a water-power site.....*462, (let) 674
Puntledge River power development, Vancouver, B. C.: novel features in flume and penstock design. By F. M. Kirsch....*793, (ed) 829, (let) 1094
Swiss hydro-electric station using water under 2800-ft. head..... *52
Utilizing water to produce nitrates for fertilization .....(n) 1052
Waldeck storage dam, on the River Eder, Germany. By Robert Grimshaw *852
Wisconsin water power law; all water-power developments under the control of the Railroad Commission 768
Waterproofing. (See Concrete; Floors, etc.)
Water pressure, Neglected first principles of masonry dam design...*442, (lets) 623, 832

WATER PURIFICATION:

Baltimore, Md., Failure of partially constructed groined arch roof. By Ezra B. Whitman.....*1101
Chemical disinfection. Water-works improvements at Ironwood, Mich. By C. A. Alderman.....*1192
Current features of public water-supplies: Hygienic aspects; Rate of installation of filters; Water sterilizations; Decolorization as an adjunct of water softening; Corrosion of metals.....1062
Chemical disinfectants:
Decolorization of water by the excess-coagulation method at Springfield, Mass.....*974
Efficiency of coagulating basins at St. Louis, Mo.....*396
Cleveland, Ohio.:
Filtration Commission recommends two mechanical filtration plants, (n) 185
Report of Cleveland Engineering Society .....(ed) 81
Decolorization of water by the excess-coagulation method at Springfield, Mass.....*974
East Liverpool, Ohio, Water-purification ordered by State Board of Health .....(n) 466
Experimental work in the investigation of a method of removing colloidal clay from the water-supply of the city of Buenos Aires, Argentina.. 15
Filtration, Paper read at annual convention of the American Water Works Association..... 44
Fort Smith, Ark., Collapse of a thin partition wall in water-works settling basin. By Walter R. Mason, *1049, *1179, (let) 1321
Gatun, Panama, Canal Zone, Water-supply and purification system; Problems of the Canal Zone reviewed and contrasts with northern water-supply conditions drawn; Pre-coagulation, aeration, sedimentation and mechanical filtration .....*650, (let) 832 *1010
Harrisburg, Penn., Negative-head or down-draft water-filter patents upheld by the United States Circuit Court; New York Continental Jewell Filtration Co. against the city of Harrisburg, Penn.....(n) 528
International investigation of the pollution of boundary waters between the United States and Canada.(ed) 669
Iron removal plant for the water-supply .....(n) 310

WATER PURIFICATION: (Continued) PAGE

Ironwood, Mich., Water-works improvements at Ironwood, Mich. By C. A. Alderman.....*1192
Louisville, Ky., Trouble with micro-organisms in the mechanical filters of Louisville, Ky. By Frederick H. Stover..... 51
Mechanical filtration:
Cleveland Filtration Commission recommends two mechanical filtration plants.....(n) 185
Failure of partially constructed groined arch roof. By Ezra B. Whitman *1101
Negative-head or down-draft water-filter patents upheld by the United States Circuit Court; New York Continental Jewell Filtration Co. against the city of Harrisburg, Penn. .....(n) 528
Notes on the construction of the St. Louis, Mo., filters. By Edward E. Wall.....*1329
St. Louis mechanical water filters; History of the St. Louis water-supply from the viewpoint of quality; Plain sedimentation and sedimentation aided by coagulation tried; mechanical filters being built. By Edward E. Wall..*808, (ed) 830
Trouble with micro-organisms in the mechanical filters of Louisville, Ky. By Frederick H. Stover.... 51
Water-works improvements at Ironwood, Mich. By C. A. Alderman.*1192
Paper on gelatin and agar bacterial counts for controlling filter operation; Annual convention of the American Water Works Association 44
Recent investigations of the bactericidal, deodorizing and physiologic action of ozone. By W. H. Thompson.(ed) 1902, 1096, (let) 1319
Richmond, Va., New water purification scheme proposed.....(n) 87
St. Louis, Mo.:
Efficiency of coagulating basins....*396
Mechanical water filters; History of the St. Louis water-supply from the viewpoint of quality; Plain sedimentation and sedimentation aided by coagulation tried; Mechanical filters being built. By Edward E. Wall.....*808, (ed) 830
Notes on the construction of the St. Louis filters. By Edward E. Wall *1329
Water-purification progress. By Edward E. Wall.....*808 (ed) 830
Slow sand filtration, Use of alum in connection with slow sand filtration at Washington, D. C. By William Firth Wells.....*248
Springfield, Mass., Decolorization of water by the excess-coagulation method *974
Sterilization:
Discovery by chemists in the Department of Agriculture....(ed) 421
Ultra-violet rays for purifying large quantities of water. By Max von Recklinghausen *376
Use of liquid chlorine for sterilizing water; Annual convention of the American Water Works Association 44
Typhoid fever in large American cities; Decrease very marked in recent years; betterment of public water-supplies. By George A. Johnson, *473, (erratum) 567
Washington, D. C., Use of alum in connection with slow sand filtration. By William Firth Wells.....*248

WATER RATES:

Charges for public water service to private fire protection systems. By W. E. Miller.....1168
Paper on rates and rate making; Annual convention of the American Water Works Association..... 42
Water rights, Engineers' Committee of the American Society of Civil Engineers to draft a federal water law .....(ed) 934

WATERSHEDS:

Determining power possibilities on a watershed; methods of constructing curves, requisite to the power determination. By Lyle A. Whitsit *496
Proposed reforestation of the Cedar River watershed, Seattle, Wash..*480

WATER SUPPLY:

Annual convention of the New England Water Works Association, Philadelphia, Penn., Sept. 10-12.. 567
Application of the flow-summation curve to problems of stream regulation and storage. By E. Clinton Jansen *1290

WATER SUPPLY: (Continued) PAGE

Auburn, N. Y. Water and air movement in relation to the contamination of the lake water-supply..... 356
Baltimore, Md., Need for water meters, (ed) 1091
Brooklyn, N. Y., Duck pond a cause of pollution to water supply....(n) 86
Buenos Aires, Argentina, Experimental work in the investigation of a method of removing colloidal clay from the water-supply of the city of Buenos Aires, Argentina..... 15
Cause of "red water" .....(n) 1117
Centerburg, Ohio, Iron removal plant for the water-supply.....(n) 310
Charges for public water service to private fire protection systems. By W. E. Miller.....1168
Cincinnati, Ohio, Water shortage caused by large water main, Dec. 6 .....(n) 1208
Cleveland, Ohio, Report of Cleveland Engineering Society.....(ed) 81
Current features of public water-supplies; Hygienic aspects; Rate of installation of filters; Water sterilization progress and limitations; Decolorization with an overdose of coagulant; Decolorization as an adjunct of water softening; Corrosion of metals.....1062
Deficient rainfall in the summer of 1913 905
Denver, Colo:
City of Denver and Denver Union Water Co. decision.....(ed) 177
Water supply problems to be investigated by engineering board, (n) 387
Des Moines, Iowa, Purchase of plant of Des Moines Water Co. Tentatively agreed on.....(n) 484
Experimental work in the investigation of a method of removing colloidal clay from the water-supply of the city of Buenos Aires, Argentina 15
Glasgow, Scotland, Water supply being increased and further extensions contemplated .....(n) 1253
Hartford, Conn., Fixing a basis in advance for comparison of alternate bids.....(ed) 221
Lining an irrigation ditch with Hess metallic fluming. By Elbert M. Chandler *464
Los Angeles, Calif.
Completion of the Los Angeles Aqueduct.....(let) 318, 1095
Complete, testing and dedication of the Los Angeles Aqueduct. By Burt A. Heinly.....*920
Marin municipal water-district, with headquarters at San Rafael, Calif., first water district to be formed under a new law in California.(n) 355
Milwaukee, Wis., Proposed water-works intake tunnel.....*155
New York City:
Catskill, Camp Hill View sanitation; Sanitary conveniences; Sanitary clauses of the contract; carrying out of the sanitary measures. By Arthur W. Tidd.....*752
Headings of Catskill Aqueduct tunnel under East River met Sept. 27 .....(n) 733
(See also Aqueducts)
Ottawa, Ont., Report of British experts on a new water-supply..1012, (ed)1038
Panama Canal Zone, Water-supply and purification system; Problems of the Canal Zone reviewed and contrasts with northern water-supply conditions drawn; pre-coagulation, aeration, sedimentation and mechanical filtration....*650, (let), 832, *1010
Panama-Pacific International Exposition of 1915, at San Francisco, Calif.; Electric light and power; Gas, steam and compressed air; Sewers and sanitary equipment; High-pressure fire-protection; roads and pavements. By A. H. Markwart *1070
Paper on basic principles of ground water collection; Annual convention of the American Water Works Association 43
Paper on water movement, air movement and lake contamination; Annual convention of the American Water Works Association.... 44
Philadelphia, Penn.:
Dual water-supplies and typhoid fever 1022
Need for water-waste prevention, (ed) 563
Railways, American Railway Bridge and Building Association; Committee report 889
Rockford, Ill., Auxiliary deep-well water-supply with electric pumps.*346

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

PAGE

WATER SUPPLY: (Continued)
Rules governing the submission of sewerage and water-supply plans to the New Jersey State Board of Health 548
St. Paul, Minn., 75-year record of rainfall *514
San Diego, Calif.:
Drastic provisions of the water-works ordinance 478
Purchase of Southern California Mountain Water Co. system...(n) 86
San Francisco, Calif.:
City wins its long Hetch Hetchy fight .....(ed) 1312
Hetch Hetchy water supply bill passed United States Senate on Dec. 6.....(n) 1259
Proposed Hetch Hetchy water-supply bill approved Sept. 3.....(n) 733
Sanitary protection of drilled wells, (n) 376
Seattle, Wash., Proposed reforestation of the Cedar River watershed *480
Seepage losses from earth canals, *402, (let) *881
Springfield, Mass., Decolorization of water by the excess-coagulation method *974
Typhoid fever in large American cities; decrease very marked in recent years; betterment of public water-supplies. By George A. Johnson, *473, (Erratum) 567
Water-works charges for private fire protection; a valuable study of the principles and practice; by Leonard Metcalf, consulting engineer, Boston, Mass.....1236
Wells. (See Wells.)
Winnipeg, Man., Gravity water supply proposed .....(ns) 574, 628, 635
Zurich, Switzerland, Increased water supply to have new intake..(n) 1079
Water tanks. (See Tanks and standpipes.)

WATER TRANSPORTATION:
Important additions to steamship service to be made by Hamburg-American Line and North German Lloyd S. S. Co.....(n) 435
Inland navigation barges with producer-gas engines; Alabama & New Orleans Transportation Co. to operate between the coal fields of Alabama and the city of New Orleans *1109
Loss of the "Volturno" and lifeboat equipment of ships..(ed) 769, (n) 780
Safety at sea, object of committee of experts appointed by Department of Commerce.....(n) 574

WATER WASTE:
Baltimore, Md., Need for water meters, (ed) 1091
Chicago, Ill., Economics of the water meter; Extract from a paper on "The Chicago Water Works." By John Ericson.....1235
New York City, Leakage detection with pulsograph; a new device for locating leaks in water mains.....*515
Philadelphia, Penn.:
Good beginning in water-waste prevention. By John S. Ely.(ed) 669, *676
Need for water-waste prevention.....(ed) 563
Pulsograph; a new device for locating leaks in water mains.....*515
(See also Water meters.)

WATERWAYS:
"Dry farmers" plan waterway from source of Missouri River to Texas, (n) 1244
(See Canals, Rivers, Harbors, for constructional details. Water transportation, for economics of.)
Waterwheels, Pelton type, 19,000-hp. vertical-shaft waterwheel under 1015-ft. head; Pirahy power station, Rio Janeiro, Brazil.....*124

WATER-WORKS:
Annual convention of the New England Water Works Association, Philadelphia, Penn., Sept. 10-12.. 567
Bringing an old water-works valuation up to date. By William E. Butt.. 408
Care and maintenance of meters and the effect on revenue. By A. W. Cuddeback 569
Charges for public water service to private fire protection systems. By W. E. Miller.....1168

PAGE

WATER-WORKS: (Continued)
Daily reports on pipe-laying; Bureau of Distribution, Department of Water, San Diego, Calif....(n) *1310
Denver, Colo.:
City of Denver and Denver Union Water Co. decision.....(ed) 177
Water-supply problems to be investigated by an engineering board .....(n) 387
Des Moines, Iowa, Purchase of plant of the Des Moines Water Co. tentatively agreed on.....(n) 484
Fort Smith, Ark.; Collapse of a thin partition wall in water-works settling basin. By Walter R. Mason, *1049, *1179, (let) 1321
Glasgow, Scotland, Water supply being increased and further extensions contemplated .....(n) 1253
Hartford, Conn.:
Cleaning water mains by contract specifications for. By Caleb Mills Saville *1098
Organization of the water-works department 1086
Industrial city of Torrance, Calif.; General layout of the city and its various public improvements described. By Ralph Bennett.....*870
Los Angeles, Calif., Completion, testing and dedication of the Los Angeles Aqueduct. By Burt A. Heinly *920
Moline, Ill., Water-works system under investigation with view to extension and improvement.....(n) 945
Panama Canal Zone, Water-supply and purification of the Canal Zone reviewed and contrasts with northern water-supply conditions drawn; pre-coagulation, aeration, sedimentation and mechanical filtration .....*650, (let) 832, *1010
Panama-Pacific International Exposition of 1915, at San Francisco, Calif.; High-pressure fire-protection. By A. H. Markwart.....*1070
Paper on private fire services; Annual convention of the American Water Works Association..... 43
Philadelphia, Penn., Dual water-supplies and typhoid fever.....1022
Prevention of the corrosion of iron water mains; Abstract of paper at the annual meeting of the American Public Health Association at Colorado Springs, September, 1913..... 570
Rules governing the submission of sewerage and water-supply plans to the New Jersey State Board of Health 548
San Diego, Calif.:
Drastic provisions of the water-works ordinance..... 478
Growth and improvement of. By H. A. Whitney.....(let) 622
Purchase of Southern California Mountain Water Co. system..(n) 86
Water-works organizations and operating methods; St. Paul, Minn., and San Diego, Calif. By H. A. Whitney .....*475, (let) 622
San Francisco, Calif., Further step toward municipal ownership of water-works taken.....(n) 1331
St. Louis, Mo., Notes on the construction of the St. Louis filters. By Edward E. Wall.....*1329
St. Paul, Minn., Water-works organizations and operating methods; St. Paul, Minn., and San Diego, Calif. By H. A. Whitney....*475, (let) 622
Water-works charges for private fire protection; a valuable study of the principles and practice. By Leonard Metcalf, consulting engineer, Boston, Mass.....1236
Water-works improvements at Ironwood, Mich. By C. A. Alderman.*1192

WATER-WORKS INTAKES:
Increased water supply for Zurich, Switzerland, to have new intake, (n) 1079
Milwaukee, Wis., Proposed water works intake tunnel.....*155
Water-works valuation, Bringing an old water-works valuation up to date. By William E. Butt..... 408
Weighing devices, Interstate Commerce Commission's report on railway-track scales..... 322
Weirs, Artificial controls for stream gaging stations; Small barriers of concrete or of rubble leveled off with cement-mortar; Types of artificial barriers and rating curves for each type. By G. S. Strout .....(let) 226

PAGE

WELDING:
Electric, Electric welding for track repairs and rail joints.....*298
Welding nickel practiced in shops using nickel sheets as raw material, (n) 616
(See Iron and steel.)

WELLS:
Auxiliary deep-well water-supply with electric pumps; Rockford, Ill....*346
Sanitary protection of drilled wells.(n) 376

WHARVES AND DOCKS:
Chicago, Ill.:
Harbor and subway plans..... 395
Indiana St. pier, 3000 ft. long and 292 ft. wide; alternative design for pier, with concrete sheet piling *552
Collapse of piers, etc., guarded against in Germany by government inspection .....(n) 205
Hamburg, Germany:
Basalt facing for concrete wall.... 929
Mechanical freight and cargo handling equipment. By I. F. Bubendey *189
Typical Hamburg quaywall.....*938
Interesting pile failure; Montgomery Dock No. 1, Portland, Ore. By John W. Cunningham.....*465
Kobe, Japan, Harbor construction. By Wilson T. Howe.....*556
Liverpool, England, Plan and sections of the Gladstone dock, at present the largest dry dock in the world.*454
New York City:
Handling west-bound freight on the North River railroad piers. By W. J. Barney.....*309
Large pier and industrial development proposed for west shore of New York harbor.....(n) 780
Quay wharf design; construction and use of empiric formulas. By Cyrus T. Brady, Jr.....*163
Reinforced-concrete wharf with grouted foundations; Harbor improvement at Iloilo, Philippine Islands. By Wilson T. Howe.....*1003
Saugatuck, Mich., Steamboat collapsed Aug. 6.....(n) 386
Torrance-Cunningham wharf-bulkhead, Savannah, Ga. By Wm. M. Torrance *710
Yokohama, Japan, Harbor construction. By Wilson T. Howe.....*556
Wheels, Wire wheels for automobiles likely to supersede wooden wheels, (n) 253
Whistles, Firedamp whistle invented. (n) 1166
Windows, Protecting plate-glass windows against blasting operations; New York subway.....1305
Wind pressure, Municipal building laws in the United States; a study of the building codes of the leading cities in the United States..... 9
Wing-walls, Formulas for length and height of abutment wing-walls for skew crossings.....(n) *1309

WIRELESS TELEGRAPHY:
British Imperial wireless telegraph system agreement with the Marconi Co. .....(n) 513
Wireless communication between United States and South America to be established .....(n) 434
Wireless telegraphy for railway trains; experimental installation on the Delaware, Lackawanna & Western R. R. .....(ed) 1246
Wireless telegraphy on moving trains adopted by Delaware, Lackawanna & Western R. R.....(n) 1159
Wisconsin, Control of municipal utility rates. By R. S. H.(ed) 467, (let) 673

WOOD:
Expansive power of water-soaked wood .....(n) *615
Heaving of wood-block pavement under extreme climatic conditions, Longview, Tex., by H. N. Roberts and P. E. Green. By C. S. Rindsfoos, *1134, (ed) 1139, (let) *1315
World, Around the world in 35 days; J. H. Mears, representative of New York "Evening Sun".....(n) 324

Y

Young Men's Christian Association, Solving the problem of "human engineering" .....982, (let) 1094

(n) = note, (ed) = editorial, (let) = letter, * = illustrated article, † = inset sheet.

AUTHOR INDEX

A

Adams, G. O., 13; Aiken, W. A., 1043; Airey, John, 226; Alderman, C. A., *1192; Allen, Edward S., *641; Allen, Kenneth, *641; Ashton, T. N., 567; Allen, Leslie H., 988.

B

Bach, Dr., *641; Baldy, M. D., 1041; Bancel, P. A., *916; Barber, A. W., 936; Barnett, Robert C., 1314; Barney, W. J., *309; Barrett, Frank I., *608; Bartlett, Terrell, *508; Beard, Robert S., *252; Becker, Donald N., 1042; Bennett, Ralph, *870, *1030, *1132; Berry, S. L., 1144; Berry, Thomas, 854; Boyd, Alfred, *316; Brady, Cyrus T., Jr., *163; Braume, G. M., 398; Brayshay, M. D., *460; Brodie, John S., 245; Brooks, Benjamin, *317, 425; Brown, J. B., *712; Brown, S. P., *62; Bubendey, I. F., *189; Buel, A. W., 86; Butt, William E., 408.

C

Campbell, Ben. J., 250; Carpenter, Harold, *737; Carter, Frank H., *616; Chandler, Elbert M., 464; Chappell, C. E., *130; Charles, Walter N., *216; Clark, H. W., 13; Coleman, F. C., *1018; Cone, V. M., *662; Cooke, M. M., *939; Corthell, E. L. 182, 215; Cromwell, C. W., *1114, *1167; Cuddeback, A. W., 569; Cunningham, John W., *376, *465, *1024.

D

Davin, W. E., 611; Davis, Arthur P., *956; Dean, A. W., 603; Dewell, H. D., 179; Dickey, A. T., 945; Doughty, M. H., 622; Downes, John R., 832; Dudley, Pendleton, 1321.

E

Eastwood, John S., 832, *1284; Eltinge, O. L., *252; Ely, John S., *676; Enright, Bernard, 524; Ericson, John, 1235; Everham, A. C., *208; Ewell, M. D., *821.

F

Field, John E., 348; Finkle, F. C., 318, 1095; Fleming, R., 9; Fletcher, Robert, 623.

G

Gandolfo, J. H., *372; Germain, E. B., *294; Gibb, H. M., *170; Gilbertson, H. S., 774; Godfrey, Edward, 371; Goodell, John M., 1095; Graham, John W., *554; Gregory, John H., 875; Griesenauer, G. J., 1296; Griffin, Russell A., 61; Grimshaw, Robert, *852.

H

Hamlin, Homer, 318; Hammatt, W. C., *881; Hanchette, F. E., *746; Hanna, F. W., *1077; Hardesty, W. P., *704; Harger, W. G., *1148; Haring, Alexander, 1295; Harris, A. L., *1172; Hatton, T. Chalkley, *1046; Haupt, Lewis M., 523; Hazen, Allen, 198, 200, 674; Heinly, Burt A., *920; Hering, Rudolph, 317; Herington, C. F., *108; Herschel, Clements, 200, *462; Hewes, Laurence J., 587; Heyn, Louis A., 1143; Hill, Philip B., *825; Himes, Albert J., 1094; Hinderlider, M. C., *910; Hinman, L. R., *1316; Hirst, A. R., 729; Hodges, Paul V., 936; Horn, W. R., *820; Horton, A. H., 1143; Howard E. E., 371; Howard, W. J., *500; Howe, Wilson T., *556, *1003; Huebner, O. E., 463; Hueckel, A. P., *290; Hunt, Robert W., 20; Huntington, Edward V., 400.

I

Ingersoll, L. R., 866.

J

James, A. R., 1042; James, Frederic W., *714; Jameson, Charles Davis, *588; Jansen, E. Clinton, *1290; Johnson, A. N., 627; Johnson, Clarence T., 1199, 1316; Johnson, Fred W., *362; Johnson, George A., *473; Jones, Frank H., 612; Jorgensen, Lars, 623.

K

Kavanagh, Charles J., *845; Keller, W. S., 767; Kirkpatrick, H. B., 524, 1315; Kirsch, F. M., 1094; Knight, W. J., 672; Koon, Sidney G., 383; Koop, Frederick W., *446.

L

Lacy, R., 721; Lane, Franklin K., 1322; Lathrop, J. C., 609; Lavis, F., 623; Lennon, William, *1316; Lepper, Fred W., *335; Lewis, Nelson P., 182; Libberton, J. H., 251; Lippincott, J. B., 318; Loomis, Chester B., *196; Loser, H. A., *1170; Louer, W. B., 1198; Low, Emile, 561, 1144; Low, Emile Reed, 323; Luten, Daniel B., 883; Luther, C. M., *816.

M

MacDonald, Charles, 472; MacDonald, Donald F., 408; Mandigo, Clark R., *112; Markwart, A. H., *895; Marston, A., 131; Martin, Charles W., *646; Mason, Walter R., 1043, 1321; Mavity, J. W., 1189; McCleary, James M., 749; McCullough, Ernest, 1250, 1318; McDaniel, A. B., *1302; McDermid, H. B., *342; McIntosh, Kenneth, 673; McLachlan, D. J., *274; Meade, Richard K., 21, *858; Melick, C. A., *129; Milinowski, Arthur L., 1144; Miller, W. E., 1168; Minton, H. A., *1204; Monroe, R., *143; Moore, George Holmes, *442; Morgan, Arthur E., 989; Morgan, O. K., *762; Moritz, E. A., 129, *402; Morris, Marshall, 1198; Morrow, S. R., *645; Moyer, J. A., 695; Mueller, Alex. V., *490.

N

Nabstedt, Arthur T., *650; Newell, F. H., 354; Newkirk, Guy S., 19; Nishkian, L. N., *1204, *558; Norris, George L., 634; North, Arthur T., 179, 426; Northrop, Albert A., 178.

O

Oakes, J. C., *231; O'Brien, Harry R., 914; Overstreet, Robert H., 516.

P

Page, John W., 1198; Palmer, H. K., 553; Parthesius, P. H., 1252; Paul, Charles H., *93; Paul, Norman M., 832; Perrine, Harold, *374, *722; Phillips, E. Allen, 429; Porter, Powell, A. O., 305; Pratt, Mason D., 1320.

Q

Quereau, C. H., 28; Quimby, Henry H., *487.

R

Ray, G. J., 272; Raymond, R. R., *150; Reiss, W. J., 425; Reswick, S., *366; Richards, Frank, 425; Rindge, Fred H., Jr., 962; Rindsfoos, C. S., *1315; Rogers, Frank H., 730.

S

Safford, Arthur T., 674; Saville, Caleb Mills, *1098; Sawyer, G. H., *1059; Sawyer, W. C., *610; Schroeter, J. P., *253; Schwarze, C. T., 936; Seaton, R. A., *721; Seurot, Paul, 566; Shanks, William J., 1044; Shaw, A. M., *300; Shenton, H. C. H., 206; Sherman, Edward C., *585; Smith, C. E., *54; Smith, J. H., *101; Smith, T. A., *611; Smyth, Walter M., 772; Snow, J. P., 773; Spaulding, H. C., 35; Stephenson, Edward Beattie, 1218; Stern, Eugene W., *258; Stevens, E. A., 728; Stewart, Clinton B., *246; Stover, Frederick H., 51; Strehan, George E., *722; Strout, G. S., 226; Stuart, James L., 818.

T

Teesdale, C. H., *1084; Thayer, Horace R., 609; Thompson, Sanford E., 1042; Thompson, W. H., 1319; Tibbetts, Fred H., *456; Tidd, Arthur W., *752, 1030; Tissington, F., *904; Torrance, Wm. M., *710, *1249; Trench, W. I., *453; Turner, C. A. P., 178; Tyrrell, H. G., *16, 225, *1020.

U

Upton, F. R., 1316.

V

Vail, John Jervis, *1118; Van Deusen, E. A., 85; Vensano, H. C., *1163; von Recklinghausen, Max., *376.

W

Wall, Edward E., *808, *1329; Ward, Joseph S., *540, *1220; Warren, George C., 1145; Watson, H. G., 128; Watt, D. A., *282; Watts, Roland, *1304; Wegmann, E., 623; Weidner, C. R., *202; Weller, Francis R., 674; Wells, Firth William, *248; Westerhouse, E. J., *958; Wheeler, R. B., 1094; Whinery, S., 750; Whipple, George C., 571; Whipple, Melville C., 571; White, Linn, 155; Whited, Willis, 538; Whitford, Noble, E., *192; Whitman, Ezra B., *1101; Whitney, H. A., 622; Whitsit, Lyle A., *496; Wickhorst, M. H., *23; Wicksteed, Henry K., *68; Wilson, H. Raynar, 550, 886, 1117; Woodruff, E. G., 384; Woods, Robert P., *688; Worcester, J. R., 1042.

Z

Zinn, A. S., *406.

ENGINEERING LITERATURE (SUPPLEMENT)

PAGE

EDITORIALS

Power and the Gulf Stream..... 574
Title-Page Dates.....1263

CORRESPONDENCE

Comments on the review of "Rational and Applied Mechanics." By Calvin M. Woodward..... 135
"Practical Railway Spiral" and the metric system. By Leonard C. Jordan 135

BOOKS REVIEWED

A

Accidents; Safeguards for the Prevention of Industrial Accidents. David Van Schaak..... 790
Accidents; Safety Methods for Preventing Occupational and Other Accidents and Disease. William H. Tolman and Leonard B. Kendall..... 790
Agricultural Drafting. Charles B. Howe.1271
Air Compression and Transmission. H. J. Thorkelson..... 330
Air; Resistance of the Air and Aviation. G. Eiffel.....1268
Alternating Currents; Practical Alternating Currents and Alternating-Current Testing. Charles F. Smith. 333
Alternating Currents and Alternating Current Machinery. Dugald C., and John Price, Jackson.....1272
American Irrigation Farming. W. H. Olin 1000
American Journal of Public Health; Papers on Ventilation.....1273
American Office, The. J. William Schulze 1270
American Railroad Economics. A. M. Sakolski 1267
American Railway Engineering Association Proceedings for 1913..... 141
American Society for Testing Materials; Report of the Committee on Preservative Coatings for Structural Materials 1271
American Standard for Flanged Fittings 787
American Telegraph Practice. Donald McNichol 786
Analyses of Coals in the United States. N. W. Lord.....1001
Arbitrations; Wright on Building Arbitrations. G. Alexander Wright.... 331
Arithmetic; Chemical Arithmetic and Calculation of Furnace Charges. Regis Chauvenet..... 138
Asphalts; Natural Rock Asphalts and Bitumens. Arthur Danby..... 787

PAGE

Australia, State Railway Muddle in. Edwin A. Pratt 333
Aviation; Resistance of the Air and. G. Eiffel 1268

B

Bacteriology; Elements of Water Bacteriology. Samuel Cate and C.-E. A. Winslow 1270
Bau Der Wolkenkratzer. Otto Rappold. 332
Beams; Continuous Beams in Reinforced Concrete. Burnard Geen 333
Beams; Simplified Formulas and Tables for Floors, Joints and Beams; Roofs, Rafters and Purlins. N. Clifford Ricker 994
Berechnung und Konstruktion der Schiffsmaschinen und Kessel. G. Bauer and O. Lasche 329
Bibliography on Valuation of Public Utilities 584
Bitumens, Natural Rock Asphalts and. Arthur Danby 787
Brickyard; Economics in Brickyard Construction and Operation. Ellis Lovejoy 330
Bridges; Treatise on Wooden Trestle Bridges. Wolcott C. Foster 329
Brown's Directory of American Gas Companies. E. C. Brown 333
Bruecken in Eisenbeton. C. Kersten 332
Brueckenbau, Das Kabel im. F. Hohlfeld 995
Building; Wright on Building Arbitrations. G. Alexander Wright 331

C

Cables; Telephone Cables. J. C. Slippy. 997
Canada, Water-Works of. Leo G. Denis. 583
Canal; Rivers and Canal Engineering. E. S. Bellasis 330
Carnegie Pocket Companion 1267
Catskill Water Supply of New York City, The. Lazarus White 1270
Cement; Portland Cement Materials and Industry in the United States. Edwin C. Eckel 328
Chemical Arithmetic and Calculation of Furnace Charges. Regis Chauvenet. 138
Chloride of Lime in Sanitation. Albert H. Hooker 331
Cities; European Cities at Work. Frederick C. Howe 1264
Cities; General Statistics of Cities: 1909 583
Civil Engineers' Pocket-Book. Albert I. Frye 1264
Coal; Analyses of Coals in the United States. N. W. Lord 1001
Coast Erosion and Protection. Ernest R. Matthews 785
College Administration; Symposium on Scientific Management and Efficiency in College Administration 137
Column Footings; Reinforced Concrete Wall Footings and Column Footings. Arthur N. Talbot 331
Committee on Preservative Coatings for Structural Materials, American Society for Testing Materials, Report of 1271
Commonwealth Engineer, The 583
Companion; Carnegie Pocket Companion. 1267
Compensation; Workmen's Compensation and Industrial Insurance. James Harrington Boyd 1267
Compression; Air Compression and Transmission. H. J. Thorkelson ... 330
Computations for Marine Engines. C. H. Peabody 138
Concrete Construction; Reinforced, Vol. II. George A. Hool 1272
Concrete; Continuous Beams in Reinforced Concrete. Burnard Geen 333
Concrete; Reinforced Concrete Wall Footings and Column Footings. Arthur N. Talbot 331
Concrete Roads and Pavements. E. S. Hanson 788
Conferences on Weights and Measures of the United States 139
Congress; Proceedings of the Sixth Congress of the International Association for Testing Materials 1270
Conservation of Water. Walter McCulloh 999
Construction; "The International Construction" 583
Continuous Beams in Reinforced Concrete. Burnard Geen 333
Copper; Pure Iron vs. Copper-Bearing Steel. Allerton S. Cushman 789

D

Dams; Indian Storage Reservoirs with Earthen Dams. William Lumisden Strange 1263
Depreciation; Regulation, Valuation and Depreciation of Public Utilities. Samuel S. Wyer 787
Design and Construction of Steam Turbines. Harold Medway Martin 786

PAGE

Design, Sewer. H. N. Ogden 1267
Designing; Steel Designing. Edward Godfrey 785
Diamantbohrungen fuer Schuerf und Aufschlussarbeiten ueber und unter Tage. Georg Glockemeier 581
Dieselmotors, Die Entstehung des. Rudolph Diesel 996
Directory; Brown's Directory of American Gas Companies. E. C. Brown .. 333
Directory; Water Works Directory and Statistics, 1913 583
Disease; Safety Methods for Preventing Occupational and Other Accidents and Disease. William H. Tolman and Leonard B. Kendall 790
Ditches, Theory of Loads on Pipes in. A. Marston and A. O. Anderson 331
Drafting, Agricultural. Charles B. Howe. 1271
Du Pont de Nemours Powder Co., E. I., The History of 1001
Dynamo Laboratory Outlines for Students in Electrical Engineering. John Fay Wilson 137
Dynamo; The Motor and the Dynamo. James Loring Arnold 332

E

Economics, American Railroad. A. M. Sakolski 1267
Economics in Brickyard Construction and Operation. Ellis Lovejoy 330
Efficiency of Turbine Blades. H. M. Martin 1263
Efficiency; Symposium on Scientific Management and Efficiency in College Administration 137
Electric Interlocking Handbook. General Railway Signal Co 332
Electric Power; Overhead Electric Power Transmission. Alfred Still 996
Electrical Engineering for Mechanical and Mining Engineers. J. S. Heather 139
Electricity; Elementary Principles of Electricity and Magnetism for Students in Engineering. Robert H. Hough and Walter M. Boehm 139
Electricity, Essentials of. W. H. Timble. 139
Electricity; First Book of Electricity and Magnetism. W. Perren Maycock 139
Electricity for the Farm and Home. Frank Koester 581
Elementary Principles of Electricity and Magnetism for Students in Engineering. Robert H. Hough and Walter M. Boehm 139
Elements of Specification Writing. Richard Shelton Kirby 789
Elements of Water Bacteriology. Samuel Cate and C.-E. A. Winslow 1270
Encyclopædia, Exporters', 1913 141
Engine; Gas-Engine Handbook. E. W. Roberts 998
Engine; Investigations and Experimental Researches for the Construction of My Large Oil Engine. H. Junkers. 141
Engineer; "The Commonwealth Engineer" 583
Engineer; "The Fire Engineer" 583
Engineering; Dynamo Laboratory Outlines for Students in Electrical Engineering. John Fay Wilson 137
Engineering; Electrical Engineering for Mechanical and Mining Engineers. J. S. Heather 139
Engineering; Elementary Principles of Electricity and Magnetism for Students in. Robert H. Hough and Walter M. Boehm 139
Engineering; Principles of Irrigation Engineering. Frederick Haynes Newell. 1269
Engineering; Rivers and Canal Engineering. E. S. Bellasis 330
Engineering; Steam Power Plant Engineering. G. F. Gebhardt 1000
Engineering; Text-Book on Highway Engineering. Arthur H. Blanchard and Henry B. Drowne 993
Engineering Thermodynamics. Charles Edward Lucke 582
Engineers; Civil Engineers' Pocket-Book. Albert I. Frye 1264
Engineers; Electrical Engineering for Mechanical and Mining Engineers. J. S. Heather 139
Engineers; Handbook for Heating and Ventilating Engineers. James D. Hoffman and Benedict F. Raber 1000
Engines; Computations for Marine Engines. C. H. Peabody 138
Engines; Farm Gas Engines. C. F. Hirshfeld and T. C. Ulbricht 1000
Entstehung des Dieselmotors, Die. Rudolf Diesel 996
Essentials of Electricity. W. H. Timble. 139
European Cities at Work. Frederick C. Howe 1264
Excavating Machinery. Allen Boyer McDaniel 580
Expenses; Handbook of Railroad Expenses. J. Shirley Eaton 329
Exporters' Encyclopædia, 1913 141

F

PAGE

Factory Lighting. Clarence E. Clewell .. 997
Farm; Electricity for the Farm and Home. Frank Koester 581
Farm Gas Engines. C. F. Hirshfeld and T. C. Ulbricht 1000
Farming; American Irrigation Farming. W. H. Olin 1000
Fire Engineer, The 583
First Book of Electricity and Magnetism. W. Perren Maycock 139
Fittings; American Standard for Flanged Fittings 787
Flat Plates; Theory of the Flexure and Strength of Rectangular Flat Plates Applied to Reinforced Concrete Floor Slabs. Henry T. Eddy 783
Flies; Reduction of Domestic Flies. Edward H. Ross 580
Flood of 1913 and How It Was Met By a Railroad. Lewis S. Bigelow 580
Flood; Ohio Valley Flood of March-April, 1913. A. H. Horton and H. J. Jackson 790
Floor Slabs; Theory of the Flexure and Strength of Rectangular Flat Plates Applied to Reinforced Concrete Floor Slabs. Henry T. Eddy 783
Floors; Simplified Formulas and Tables for Floors, Joists and Beams; Roofs, Rafters and Purlins. N. Clifford Ricker 994
Foot, The Soldier's Foot and the Military Shoe. Edward Lyman Munsen 1273
Forests, Relation of, in the Atlantic Plain to the Humidity of the Central States and Prairie Region 581
Formulas; Simplified Formulas and Tables for Floors, Joists and Beams; Roofs, Rafters and Purlins. N. Clifford Ricker 994
Frontinus, Sextus Julius; Two Books on the Water Supply of Rome 581
Furnace; Chemical Arithmetic and Calculation of Furnace Charges. Regis Chauvenet 138
Furnaces, Refractories and. F. T. Havard 138
Further Problems in the Theory and Design of Structures. Ewart S. Andrews 784

G

Gas; Brown's Directory of American Gas Companies. E. C. Brown 333
Gas Analysis. L. M. Dennis 136
Gas-Engine Handbook, The. E. W. Roberts 998
Gas Engines, Farm. C. F. Hirshfeld and T. C. Ulbricht 1000
General Metallurgy. H. O. Hofman 788
General Statistics of Cities: 1909 583
Gulf Stream, Power and Control of the. Carroll Livingston Riker 327

H

Handbook; Electric Interlocking Handbook. General Railway Signal Co.. 332
Handbook for Heating and Ventilating Engineers. James D. Hoffman and Benedict F. Raber 1000
Handbook, The Gas-Engine. E. W. Roberts 998
Handbuch der Ingenieurwissenschaften. Part I, Vol. 2, Der Wasserbau. Th. Rehbock and others 139
Handbook of Railroad Expenses. J. Shirley Eaton 329
Handbook on Sanitation. George M. Price 1269
Heat; Introduction to the Mathematical Theory of Heat Conduction. L. R. Ingersoll and O. J. Zobel 141
Heating; Handbook for Heating and Ventilating Engineers. James D. Hoffman and Benedict F. Raber 1000
Heating; The Theory and Practice of Heating and Ventilation. Arthur H. Barker 1264
Highway; Text-Book on Highway Engineering. Arthur H. Blanchard and Henry B. Drowne 993
History of the E. I. du Pont de Nemours Powder Co 1001
Hydraulic Turbines. R. L. Daugherty ... 999

I

Improvement of Rivers, The. B. F. Thomas and D. A. Watt 577
Indian Storage Reservoirs with Earthen Dams. William Lumisden Strange .. 1263
Industry; Portland Cement Materials and Industry in the United States. Edwin C. Eckel 328
Inefficiency, The Price of. Frank Koester 136
Inskip's Tables. G. D. Inskip 334
Institution of Municipal and County Engineers, Journal of 583
Insurance; Workmen's Compensation and Industrial Insurance. James Harrington Boyd 1267

PAGE

International Association for Testing Materials; Proceedings of Sixth Congress of 1270
International Construction, The 583
Introduction to the Mathematical Theory of Heat Conduction. L. R. Ingersoll and O. J. Zobel 141
Investigations and Experimental Researches for the Construction of My Large Oil Engine. H. Junkers 141
Iron; Pure Iron vs. Copper-Bearing Steel. Allerton S. Cushman 789
Irrigation; American Irrigation Farming. W. H. Olin 1000
Irrigation; Principles of Irrigation Engineering. Frederick Haynes Newell 1269
Irrigation Works. E. S. Bellasis 998

J

Joists; Simplified Formulas and Tables for Floors, Joists and Beams; Roofs, Rafters and Purlins. N. Clifford Ricker 994
Journal of the Institution of Municipal and County Engineers 583

K

Kabel im Brueckenbau, Das. F. Hohlfeld 995

L

Labor; Road Making by Convict Labor .. 784
Laboratory Manual of Testing Materials. William Kendrick Hatt and H. H. Scofield 788
Lehrbuch des Hochbaues. Easelborn ... 332
Lehrbuch des Maschinenbaues. Karl Easelborn 997
Leitfaden der Flugtechnik. Siegmund Huppert 1268
Leitfaden zum Berechnen und Entwerfen von Luftungs- und Heizungs-Anlagen. H. Reitschel and K. Brabbee 998
Library; The Railway Library, 1912. Slason Thompson 791
Lighting; Factory Lighting. Clarence E. Clewell 997
Lime; Chloride of Lime in Sanitation. Albert H. Hooker 331
Liquid Steel; Its Manufacture and Cost. David Carnegie and Sydney C. Gladwyn 328
London Motor Traffic 579

M

Machinen-Zeichnen, Das. A. Riedler 331
Machinery; Alternating Currents and Alternating Current Machinery. Dugald C., and John Price, Jackson. 1272
Machinery, Excavating. Allen Boyer McDaniel 580
Magnetism; Elementary Principles of Electricity and Magnetism for Students in Engineering. Robert H. Hough and Walter M. Boehm 139
Magnetism; First Book of Electricity and. W. Perren Maycock 139
Making of a Town, The. Frank L. McVey 1001
Management, Rules of. William Lodge .. 999
Manual; Laboratory Manual of Testing Materials. William Kendrick Hatt and H. H. Scofield 788
Manual; Patrolman's Manual; City of Philadelphia. George D. Porter 332
Materials; Laboratory Manual of Testing Materials. William Kendrick Hatt and H. H. Scofield 788
Materials; Portland Cement Materials and Industry in the United States. Edwin C. Eckel 328
Mathematics, Practical. Part IV. Claude Irwin Palmer 140
Mathematics; Shop Mathematics, Vol. II. Earle B. Norris and Ralph T. Craigo .. 1271
Measures; Conferences on Weights and Measures of the United States 139
Metallurgy, General. H. O. Hofman 788
Mill; The Rolling Mill Industry. F. H. Kindl 785
Mine Surveying. Edward B. Durham .. 1266
Modern Warship, The. Edward L. Attwood 581
Motor and the Dynamo, The. James Loring Arnold 332
Motor; London Motor Traffic 579

N

Natural Rock Asphalts and Bitumens. Arthur Danby 787
Neuere Bogenbruecken aus Umschnuertem Gusseisen. Fritz von Emperger. 995
New York City, The Catskill Water Supply of. Lazarus White 1270
New York Society of Architects, Year Book for 1913 1272

PAGE

O

Ohio Valley Flood of March-April, 1913. A. H. Horton and H. J. Jackson 790
Oil Engine; Investigations and Experimental Researches for the Construction of My Large Oil Engine. H. Junkers 141
Office, The American. J. William Schulze. 1270
Overhead Electric Power Transmission. Alfred Still 996

P

Papers on Ventilation, American Journal of Public Health 1273
Patrolman's Manual; City of Philadelphia. George D. Porter 332
Pavements; A Treatise on Roads and. Ira Osborn Baker 1271
Pavements, Concrete Roads and. E. S. Hanson 788
Pipes; Theory of Loads on Pipes in Ditches. A. Marston and A. O. Anderson 331
Pocket-Book, Civil Engineers'. Albert I. Frye 1264
Pocket Companion, Carnegie 1267
Portland Cement Materials and Industry in the United States. Edwin C. Eckel 328
Powder; History of the E. I. du Pont de Nemours Powder Co 1001
Power and Control of the Gulf Stream. Carroll Livingston Riker 327
Power Plant Testing. James Ambrose Moyer 1271
Power; Steam Power Plant Engineering. G. F. Gebhardt 1000
Power; The Principles of the Application of Power to Road Transport. H. E. Wimperis 1001
Power Transmission; Overhead Electric Power Transmission. Alfred Still .. 996
Practical Alternating Currents and Alternating-Current Testing. Charles F. Smith 333
Practical Mathematics. Part IV. Claude Irwin Palmer 140
Preservative Coatings for Structural Materials; American Society for Testing Materials, Report of the Committee on 1271
Price of Inefficiency, The. Frank Koester 136
Principles of Irrigation Engineering. Frederick Haynes Newell 1269
Principles of the Application of Power to Road Transport, The. H. E. Wimperis 1001
Problems; Further Problems in the Theory and Design of Structures. Ewart S. Andrews 784
Problems, Railway. William Z. Ripley .. 1267
Problems; Solution of Railroad Problems by the Slide Rule. E. R. Cary 786
Proceedings; American Railway Engineering Association Proceedings for 1913 141
Proceedings of Sixth Congress of the International Association for Testing Materials 1270
Public Utilities, Bibliography on Valuation of 584
Public Utilities, Regulation, Valuation and Depreciation of. Samuel S. Wyer 787
Pure Iron vs. Copper-Bearing Steel. Allerton S. Cushman 789
Purlins; Simplified Formulas and Tables for Floors, Joists and Beams; Roofs, Rafters and Purlins. N. Clifford Ricker 994

R

Rafters; Simplified Formulas and Tables for Floors, Joists and Beams; Roofs, Rafters and Purlins. N. Clifford Ricker 994
Railroad; American Railroad Economics. A. M. Sakolski 1267
Railroad; Flood of 1913 and How It Was Met by a Railroad. Lewis S. Bigelow 580
Railroad; Handbook of Railroad Expenses. J. Shirley Eaton 329
Railroad; Solution of Railroad Problems by the Slide Rule. E. R. Cary 786
Railway Library, 1912, The. Slason Thompson 791
Railway Problems. William Z. Ripley .. 1267
Railway; State Railway Muddle in Australia. Edwin A. Pratt 333
Rainfall, Reservoirs and Water Supply. Alexander R. Binnie 783
Reduction of Domestic Flies. Edward H. Ross 580
Refractories and Furnaces. F. T. Havard 138
Regulation, Valuation and Depreciation of Public Utilities. Samuel S. Wyer. 787
Reinforced-Concrete Construction, Vol. II. George A. Hool 1272
Reinforced Concrete, Continuous Beams in. Burnard Geen 333

PAGE

Reinforced Concrete Wall Footings and Column Footings. Arthur N. Talbot 331
Relation of Forests in the Atlantic Plain to the Humidity of the Central States and Prairie Region 581
Report; Eighth Report of the Royal Commission on Sewage Disposal 1269
Report of the Committee on Preservative Coatings for Structural Materials; American Society for Testing Materials 1271
Reservoirs; Indian Storage Reservoirs with Earthen Dams. William Lumisden Strange 1263
Reservoirs; Rainfall, Reservoirs and Water Supply. Alexander R. Binnie 783
Resistance of the Air and Aviation. G. Eiffel 1268
Rivers and Canal Engineering. E. S. Bellasis 330
Rivers, Improvement of. B. F. Thomas and D. A. Watt 577
Road Making by Convict Labor 784
Road Transport, The Principles of the Application of Power to. H. E. Wimperis 1001
Roads; A Treatise on Roads and Pavements. Ira Osborn Baker 1271
Roads; Concrete Roads and Pavements. E. S. Hanson 788
Rochester, N. Y. Sewage Disposal System. Edwin A. Fisher 580
Rock; Natural Rock Asphalts and Bitumens. Arthur Danby 787
Rolling Mill Industry, The. F. H. Kindl 785
Rome; Two Books on the Water Supply of Rome of Sextus Julius Frontinus. 581
Roofs; Simplified Formulas and Tables for Floors, Joists and Beams; Roofs, Rafters and Purlins. N. Clifford Ricker 994
Royal Commission on Sewage Disposal, Eighth Report of 1269
Rules of Management. William Lodge .. 999

S

Safeguards for the Prevention of Industrial Accidents. David Van Schaak 790
Safety First. George Bradshaw 788
Safety Methods for Preventing Occupational and Other Accidents and Disease. William H. Tolman and Leonard B. Kendall 790
Sanitation, Chloride of Lime in. Albert H. Hooker 331
Sanitation, Handbook on. George M. Price 1269
"Scientific American" Reference Book. Albert A. Hopkins and A. Russell Bond 1001
Scientific Management; Symposium on Scientific Management and Efficiency in College Administration 137
Seehaufenbau. F. W. Otto Schulze 789
Sewage Disposal, Eighth Report of Royal Commission on 1269
Sewage Disposal; Rochester, N. Y. System. Edwin A. Fisher 580
Sewage Disposal, Water Purification and. J. Tillmans 1265
Sewer Design. H. N. Ogden 1267
Shoe; The Soldier's Foot and the Military Shoe. Edward Lyman Munsen 1273
Shop Mathematics, Vol. II. Earle B. Norris and Ralph T. Craigo 1271
Shop Sketching. Joseph W. Woolley and Roy B. Meredith 1271
Simplified Formulas and Tables for Floors, Joists and Beams; Roofs, Rafters and Purlins. N. Clifford Ricker 994
Slide Rule, Solution of Railroad Problems by the. E. R. Cary 786
Soldier's Foot and the Military Shoe, The. Edward Lyman Munsen 1273
Solution of Railroad Problems by the Slide Rule. E. R. Cary 786
Specification; Elements of Specification Writing. Richard Shelton Kirby ... 789
Specifications and Tables for Steel Framed Structures 1264
Standard; American Standard for Flanged Fittings 787
State Railway Muddle in Australia, The. Edwin A. Pratt 333
Statistics; General Statistics of Cities: 1909 583
Statistics; Water Works Directory and Statistics, 1913 583
Steam Power Plant Engineering. G. F. Gebhardt 1000
Steel; Liquid Steel: Its Manufacture and Cost. David Carnegie and Sydney C. Gladwyn 328
Steel; Pure Iron vs. Copper-Bearing Steel. Allerton S. Cushman 789
Steel Designing. Edward Godfrey 785
Steel; Specifications and Tables for Steel Framed Structures 1264
Storage Reservoirs; Indian Storage Reservoirs with Earthen Dams. William Lumisden Strange 1263
Strobel Steel Construction Co 36

PAGE

Structural Materials; Report of the Committee on Preservative Coatings for; American Society for Testing Materials 1271
Structures; Further Problems in the Theory and Design of Structures. Ewart S. Andrews 784
Structures; Specifications and Tables for Steel Framed Structures 1264
Structures; Theory and Design of. Ewart S. Andrews 784
Students; Dynamo Laboratory Outlines for Students in Electrical Engineering. John Fay Wilson 137
Students; Elementary Principles of Electricity and Magnetism for Students in Engineering. Robert H. Hough and Walter M. Boehm 139
Surveying; Mine Surveying. Edward H. Durham 1266
Symposium on Scientific Management and Efficiency in College Administration 137

T

Tables Annuelles Constantes et Donnees Numeriques de Chimie, de Physique et de Technologie. S.-L. Archbutt .. 581
Tables, Inskip's. G. D. Inskip 334
Tables; Simplified Formulas and Tables for Floors, Joists and Beams; Roofs, Rafters and Purlins. N. Clifford Ricker 994
Tables; Specifications and Tables for Steel Framed Structures 1264
Telegraph; American Telegraph Practice. Donald McNichol 786
Telephone Cables. J. C. Slippy 997
Test; Theory and Test of an Overshot Water Wheel. Carl Robert Weidner. 333
Testing; Laboratory Manual of Testing Materials. William Kendrick Hatt and H. H. Scofield 788
Testing; Power Plant Testing. James Ambrose Moyer 1271
Testing; Practical Alternating Currents and Alternating-Current Testing. Charles F. Smith 333
Text-Book on Highway Engineering. Arthur H. Blanchard and Henry B. Drowne 993
Text-Book on Trade Waste Waters; Their Nature and Disposal. H. Maclean Wilson and H. T. Calvert 788
Theory and Design of Structures. Ewart S. Andrews 784
Theory and Practice of Heating and Ventilation, The. Arthur H. Barker. 1264
Theory and Test of an Overshot Water Wheel. Carl Robert Weidner 333
Theory of the Flexure and Strength of Rectangular Flat Plates Applied to Reinforced Concrete Floor Slabs. Henry T. Eddy 783

PAGE

Theory of Loads on Pipes in Ditches, The. A. Marston and A. O. Anderson 331
Thermodynamics, Engineering. Charles Edward Lucke 582
Thermodynamik der Turbomaschinen. Guido Zerkowitz 140
Town; The Making of a Town. Frank L. McVey 1001
Trade Waste; Text-Book on Trade Waste Waters; Their Nature and Disposal. H. Maclean Wilson and H. T. Calvert 788
Traffic; London Motor Traffic 579
Transmission, Air Compression and. H. J. Thorkelson 330
Treatise on Roads and Pavements, A. Ira Osborn Baker 1271
Treatise on Wooden Trestle Bridges. Wolcott C. Foster 329
Turbines; Design and construction of Steam Turbines. Harold Medway Martin 786
Turbines; Hydraulic Turbines. R. L. Daugherty 999

U

United States, Analyses of Coals in. N. W. Lord 1001
United States; Conferences on Weights and Measures of the United States .. 139
United States, Portland Cement Materials and Industry in the. Edwin C. Eckel 328

V

Valuation; Regulation, Valuation and Depreciation of Public Utilities. Samuel S. Wyer 787
Ventilating; Handbook for Heating and Ventilating Engineers. James D. Hoffman and Benedict F. Raber 1000
Ventilation, Papers on. American Journal of Public Health 1273
Ventilation; The Theory and Practice of Heating and Ventilation. Arthur H. Barker 1264

W

Wall Footings; Reinforced Concrete Wall Footings and Column Footings. Arthur N. Talbot 331
Warship, The Modern. Edward L. Attwood 581
Water, Conservation of. Walter McCulloh 999
Water; Elements of Water Bacteriology. Samuel Cate and C.-E. A. Winslow .. 1270
Water Purification and Sewage Disposal. J. Tillmans 1265
Water Supply, Rainfall, Reservoirs and. Alexander R. Binnie 783

PAGE

Water Supply; The Catskill Water Supply of New York City. Lazarus White 1270
Water Supply; Two Books on the Water Supply of Rome of Sextus Julius Frontinus 581
Water Wheel; Theory and Test of an Overshot Water Wheel. Carl Robert Weidner 333
Water Works Directory and Statistics, 1913 583
Water-Works of Canada. Leo G. Denis .. 583
Waters; Text-Book on Trade Waste Waters; Their Nature and Disposal. H. Maclean Wilson and H. T. Calvert 788
Weights; Conferences on Weights and Measures of the United States 139
Wheel; Theory and Test of an Overshot Water Wheel. Carl Robert Weidner 333
Wirkingsgrad von Dampfturbinen-Beschaufungen, Der. Paul Wagner ... 997
Work; European Cities at Work. Frederick C. Howe 1264
Workmen's Compensation and Industrial Insurance. James Harrington Boyd. 1267
Works; Irrigation Works. E. S. Bellasis 998
Wright on Building Arbitrations. G. Alexander Wright 331
Writing, Elements of Specification Writing. Richard Shelton Kirby 789

Y

Year Book for 1913, New York Society of Architects 1272

REVIEWERS

Berg, Ernst J 1272
Burrell, G. A 136
Campbell, William 328, 788
Carpenter, A. W 994
FitzGerald, Desmond 1263
Gantt, H. L 1270
Gray, C. D 996
Hall, John L 785
Hanna, F. W 998
Harts, William W 577, 785, 789
Herschel, Winslow H 140, 331, 996
Herzstein, Joseph 998
Howe, Malverd A 783
Kimball, D. D 1265
Kuichling, Emil 139
Landreth, William B 580
Langmuir, Irving 141
Longwell, H. E 786, 999
Markwart, A. H *895, *1070
Moisseiff, Leon S 332, 995
Moore, Lewis E 784
Potter, R. R 790, 999, 1271
Richards, C. R 330, 582
Stoughton, Bradley 138
Taylor, D. W 138, 329, 581
Tracy, L. D 1266
Whinery, S 787, 993

CONSTRUCTION NEWS (SUPPLEMENT) CONTRACT PRICES

PAGE

A

AKRON, OHIO:
Pipe line 33
Purification plant 214
Albany, N. Y. See "Barge Canal."
ATLANTIC CITY, N. J.:
Paving 263
Water mains 294

B

BALTIMORE, MD.:
Pipe and specials 49
Sluice gates 49
Water mains 216
BARGE CANAL, ALBANY, N. Y.:
Contract 25 200
Contract 27 200
Contract 93 138
Contract 100 216
Contract 110 407
Contract 114 216
BELFAST, MAINE:
Dam 67
Purification plant 67
BOSTON, MASS.:
Bridge, Granite Ave 406
Paving 327
Tunnel 419
Breakwater, Chicago, Ill 69
BRIDGE:
Boston, Mass 406
Chicago, Ill 33
Brooklyn, N. Y., paving 217

PAGE

C

Calumet Sag Channel, Chicago, Ill 264
CANAL, BARGE, ALBANY, N. Y.:
Contract 25 200
Contract 27 200
Contract 93 138
Contract 100 216
Contract 110 407
Contract 114 216
Canal, Malta, Mont 172
CATSKILL AQUEDUCT, NEW YORK, N. Y.:
Contract 70 106
Contract 117 136
Contract 121 106
Channel, Calumet Sag, Chicago, Ill 264
CHICAGO, ILL.:
Bridge 33
Breakwater 33
Calumet Sag Channel 264
Sewer 69, 359
Timber 216
Cincinnati, Ohio, sewer 279, 294
Conduit, New York, N. Y 152

D

DAM:
Belfast, Maine 67
Harrisburg, Penn 67
Dobson North Canal, Malta, Mont 172
Dorchester Tunnel, Boston, Mass 419
Durant, Okla., sewer 108

E

Earthwork and structures, Malta, Mont. 407

PAGE

G

Granite Ave. bridge, Boston, Mass 406

H

HARRISBURG, PENN.:
Dam 67
Wall, protective 69
Hartford, Conn., pipe line 49
Henryetta, Okla., sewer 108
High pressure water mains, New York, N. Y 68
HIGHWAYS:
Olympia, Wash., State 313, 314
Revere, Mass 172
Sacramento, Calif., State 68, 107, 312

I

Intake tower, St. Louis, Mo 32

K

Kenmore, Ohio, laying water pipe 186
Kingsville, Tex., sewer 360
Knoxville, Iowa, paving 172

L

Leon, Iowa, paving 171
Lincoln, Memorial, Washington, D. C 200
Lock and dam, Wheeling, W. Va 122

PAGE

M

Madisonville sewer, Cincinnati, Ohio... 279
MALTA, MONT.:
Canal, Dobson North..... 172
Earthwork and structures..... 407
Marshall, Mich., sewer..... 105
Mill Creek sewer, Cincinnati, Ohio..... 294
Monroe City, Mo., water system..... 171
Mystic sewer, Boston, Mass..... 420

N

Newark, Del., sewer..... 49
Newark, N. J., Passaic Valley Sewer. See "Sewer, Passaic Valley."
New London, Conn., steamship terminal. 405
Newton, N. J., road..... 328
NEW YORK, N. Y.:
See "Catskill Aqueduct," "Conduit," "Paving," "Rapid Transit System," "Reservoir," "Sewer."
North Shore Intercepting sewer, Chicago, Ill. 359

O

Olympia, Wash. See "Highways."

P

Passaic Valley Sewer; see "Sewer, Passaic Valley."
PAVING:
Atlantic City, N. J..... 263
Boston, Mass..... 327
Brooklyn, N. Y.....217, 264, 295
Glencoe, Ill..... 67
Knoxville, Iowa..... 172
Leon, Iowa..... 171
New York, N. Y.....67, 295
Pocomoke City, Va..... 67
St. Louis, Mich..... 69
Stryker, Ohio..... 215
Pipe and specials, Baltimore, Md..... 49
PIPE LINE:
Akron, Ohio..... 33
Hartford, Conn..... 49
Pittsburgh, Penn., sewer..... 295
Portland, Maine, sewer..... 68
PURIFICATION PLANT:
Akron, Ohio..... 67
Belfast, Maine..... 214

R

RAPID TRANSIT SYSTEM, NEW YORK, N. Y.:
Route, 50..... 358
Section 1, Routes 4 and 36..... 106
Section 1, Route 16..... 390
Section 1A, Routes 19 and 22..... 392
Section 1, Routes 36 and 37.....151, 171
Section 2, Routes 4 and 38.....248, 391
Section 2, Route 18..... 378
Section 3, Routes 4 and 38..... 343
Section 4, Route 5..... 32
Section 5, Routes 4 and 38.....344, 345
Reservoir, New York, N. Y..... 152
Revere, Mass., highways..... 172
River Improvement, Watervliet, N. Y.... 34
Road, Newton, N. J..... 328

S

Sacramento, Calif., highways, state..68, 107
St. Louis, Mich., paving..... 69
St. Louis, Mo., intake tower..... 32
Schenectady, N. Y., sewer..... 32
SEWER:
Chicago, Ill.....69, 359
Cincinnati, Ohio.....279, 294
Durant, Okla..... 108
Henryetta, Okla..... 108
Kingsville, Tex..... 360
Marshall, Mich..... 105
Newark, Del..... 49
Newark, N. J., Passaic Valley Sewer, Section 1.....378, 68
Section 2..... 217
Section 3..... 420
Section 6..... 108
Section 8..... 295
Section 19..... 108
New York, N. Y..... 186
Pittsburgh, Penn..... 295
Portland, Maine..... 68
Schenectady, N. Y..... 32
Waterloo, N. Y..... 217
Watonga, Okla..... 122
Sluice gates, Baltimore, Md..... 49
State highways; see "Highways."
Steamship terminal, New London, Conn. 405
Street work, N. Y..... 216
Stryker, Ohio, paving..... 215
Subway, New York, N. Y.; see "Rapid Transit System."

T

Timber, Chicago, Ill..... 216
Tunnel, Boston, Mass.....264, 419

W

Wall, protective, Harrisburg, Penn..... 69
Washington, D. C., Lincoln Memorial... 200
Waterloo, N. Y., sewer..... 217
WATER MAINS:
Atlantic City, N. J..... 294
Baltimore, Md..... 216
New York, N. Y., high pressure..... 68
Water pipe, laying, Kenmore, Ohio..... 186
Water System, Monroe City, Mo..... 171
Watervliet, N. Y., river improvement.... 34
Watonga, Okla, sewer..... 122
Waynesboro, Penn., paving..... 107
Wheeling, W. Va., lock and dam..... 122